PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	Bachelor of Science (BSc Hons) Master of Earth Science (MEarthSci)
4	**Programme Title**	Earth Science
5	**UCAS/Programme Code**	F641 BSc Earth Science F646 BSc Earth Science with Year in Industry 1641U BSc Earth Science with Year in Industry F640 MEarthSci Earth Science F645 MEarthSci Earth Science with Year in Industry 1642U MEarthSci Earth Science with Year in Industry
6	**Programme Accreditation**	
7	**QAA Subject Benchmark(s)**	Earth Sciences, Environmental Sciences and Environmental Studies
8	**FHEQ Level**	Level 6 (F641, F646, 1641U) Level 7 (F640, F645, 1642U)
9	**Last updated**	May 2023

10	**Programme Aims**
1	To give graduates a sound first degree-level education in the Earth Sciences that can be used in a variety of ways in later life for the benefit of the individual and society.
2	To develop an understanding of the fundamental processes and cycles that shape the Earth as a dynamic planet.
3	To develop an understanding of the fundamental processes of geological time.
4	To develop an understanding of the fundamental processes of three-dimensional spatial relationships at a variety of scales.
5	To develop an understanding of the fundamental processes of the occurrence and distribution of geological natural resources, including fuels, minerals and water.
6	To develop an understanding of the fundamental role of geochemistry and geomicrobiology in shaping the process of Earth Science
7	To develop an understanding of the management of geological systems in the context of human activities, including civil engineering.
8	To give graduates training in key specific practical components that are unique to the geosciences, such as field mapping and GIS so that they are equipped to seek work that leads to professional status as a Chartered Geologist.
9	To equip graduates with a range of transferable skills (team working, the ability to work alone, observational and analytical skills, numeracy and the ability to interpret the unknown from limited data) gained through an education in the Earth Sciences to enable them to enter a range of employment sectors that appreciate such skills.
10	For the programmes with Year in Industry, to provide practical experience of the application of both technical and transferable graduate skills in the sector workplace and recording of those skills towards professional qualification (as appropriate).
For students on the Careers Placement Year programme:	
11	Provide students with the experience of seeking and securing a position with an employer.
12	Facilitate independent self-management and proactive interaction in a non-university

setting.

13 Provide a period of practical work experience that will benefit current academic study and longer term career plans.

14 Enable students to ethically apply their knowledge and skills in the work place, reflect upon their development and effectively evidence and articulate their learning in relevant future settings.

The MEarthSci route is specifically designed to take advantage of our long history of provision at MSc level throughout the School (Applied Hydrogeology, Engineering Geology, Geotechnical Engineering, Environmental Consultancy, Environmental Engineering, Petroleum Geochemistry, Clean Technology and Renewable Energy Enterprise and Management). This will make the programme distinctive from those offered elsewhere, as Newcastle graduates will be particularly well prepared for key employment sectors.

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have references to the benchmark statements for (Earth Sciences, Environmental Sciences and Environmental Studies) (ES3).

Knowledge and Understanding

On completing the programme students should:

A1 Understand the need for both a multidisciplinary and interdisciplinary approach in advancing knowledge and understanding of Earth Systems, drawing, as appropriate, from the natural and social sciences.

A2 Understand the processes which shape the natural world at different temporal and spatial scales and their influence on and by human activities.

A3 Understand the terminology, nomenclature and classification systems used in ES3.

A4 Understand the methods of acquiring, interpreting and analysing ES3 information with a critical understanding of the appropriate contexts for their use.

A5 Understand the issues concerning the availability and sustainability of resources, for example, the different value sets relating to the Earth's resources as commodities and/or heritage.

A6 Understand the contribution of ES3 to debates on environmental issues and how knowledge of these forms the basis for informed concern about the Earth and its people.

A7 Understand the contribution of their subject to the development of knowledge about the world we live in.

A8 Understand the relevance of knowledge and skills acquired on their programme of study to professional activity, responsible citizenship and the world of work.

A9 The different roles within a team and the importance of leadership.

On completing the MEarthSci programme, students should also have gained knowledge and understanding of:

A10 Developing technologies related to ES3 or the student's chosen specialism (within the Earth Systems Science and Engineering remit).

A11 Mathematical and computer models relevant to ES3 and an appreciation of their limitations.

A12 Management practices and their limitations, as adopted throughout the project cycle.

For Students on the Careers Placement Year programme:

A13 Apply personal and professional development strategies to prioritise, plan, and manage their own skills development and learning.

A14 Research, select and apply relevant knowledge aimed at enhancing their own skills and effectiveness in specific duties at their placement.

A15 Demonstrate an understanding of a work environment, how it functions and their contribution to it.

A16 Relate their work based learning to other areas of personal development, including academic performance.

Teaching and Learning Methods

Knowledge and understanding is mainly imparted through lectures (A1-A12), which for some outcomes (A6-A7), are given by external speakers with particular specialisms. Tutorials are typically used where students need to practise methods and techniques (A5-A7, A11-A12) and laboratories and field classes help to reinforce messages that have been initially conveyed in lectures. The tutorial and project design modules in stages 1and 3 help students to see the wider picture (A1, A6-A8) and also expose them to a range of other concerns (A1, A6-A8), while site visits aid their appreciation of some of the roles earth scientists and engineers fulfil (A1-A12). The field course modules in stages 1, 2 and 3 will synthesise all the teaching to give the students a holistic understanding of the interrelationships between all aspects of earth science.

For the MEarthSci programme, teamwork (A9, A12) is an important element of the group project, and the focus in stage 4 on project work allows students to become conversant with latest developments (A10-A11). The Environment Business module in stage 4 introduces the students to business practices (A12).

Assessment Strategy

The primary means of assessment of knowledge and understanding is by unseen written examinations. These are supplemented by assessed coursework, consisting mainly of project reports and laboratory / field class reports.

Intellectual Skills

On completing the programme students should be able to:

B1 Recognise and use subject-specific theories, paradigms, concepts and principles.
B2 Analyse, synthesise and summarise experimental or computational information critically, including prior research, and determine their strength and validity.
B3 Collect and integrate several lines of evidence to formulate and test hypotheses.
B4 Identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
B5 Apply knowledge and understanding to complex and multidimensional problems in familiar and unfamiliar contexts.
B6 Investigate and define a problem and identify constraints including environmental and sustainability limitations, social matters, health and safety and risk assessment issues.
B7 Recognise the moral and ethical issues of investigations and appreciate the need for professional codes of conduct.
B8 Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.
B9 Manage the design process and evaluate outcomes.
B10 Comprehend the broad picture and thus work with an appropriate level of detail.
B11 Plan, conduct and report a major programme of investigative work.

On completing the MEarthSci programme, students should also be able to:

B12 Recognise commercial risks and understand how managers can respond.
B13 Understand the technical and intellectual demands of the subject

Teaching and Learning Methods

Intellectual skills are acquired through the teaching and learning programme outlined in section 11 (B13). In particular, analysis and problem solving skills (B1-B12) are developed through example classes, tutorials and coursework, and field skills are developed through coursework activities and field work (B1-B11). Experimental results are generated in laboratory and field work and students are expected to analyse and make sense of their data (B2-B6). All students undertake a major individual project in their final year that will require them to scope a particular project that is associated within a wider theme based subject areas and produce a detailed report (B1-B13).

Assessment Strategy

Written coursework assignments, which include group project reports, laboratory reports and a report on a substantial individual project, are the principal means of assessment for these skills, although some may also be assessed by examinations, which in some circumstances are open book exams.

Practical Skills

On completing the programme students should be able to:

C1 Plan, conduct and report on investigations, including the use of secondary data.

C2 Collect, record and analyse data using appropriate techniques in the field and laboratory.

C3 Undertake field and laboratory investigations in a responsible and safe manner, paying due attention to risk assessment, rights of access, relevant health and safety regulations, and sensitivity to the impact of investigations on the environment and stakeholders.

C4 Apply quantitative methods and computer-based models relevant to ES3, to solve scientific problems, and with an awareness of the limitations of such models.

C5 Identify and manage cost drivers.

C6 Ensure fitness for purpose for all aspects of a project including design, construction, operation, maintenance and decommissioning.

C7 Reference work in an appropriate manner.

C8 Produce project plans and recognise the need to revise and update as circumstances change.

C9 Ability to extract data pertinent to an unfamiliar problem,and apply in its solution using computer based engineering tools when appropriate.

C10 Ability to manage time and control deadlines

Teaching and Learning Methods

Students have numerous opportunities to carry out experiments in the School's laboratories, but must attend induction programmes to reinforce the need to conduct themselves safely before beginning work (C3). Specific field and project skills are developed in a range of disciplines and the field trips and residential field course modules bring these together, requiring a holistic view of the selected field and project work that includes an awareness of costs and the complete project cycle (C1-C10). Particular industry-standard software is introduced in the relevant modules, some of which students will have a chance to use themselves (C4).

For the MEarthSci programme, the Project in stage 3 is a team effort that requires groups of students to collect information to develop a solution to the open-ended problem set. This will, necessarily, involve plans being produced that will later need to be revised in the light of new information (C1-C10).

Assessment Strategy

The ability to use practical skills is mainly assessed by means of written assignments, including design calculations, laboratory and field class reports, project reports and the report from a substantial individual project.

Transferable/Key Skills

On completing the programme students should be able to:

D1 Receive and respond to a variety of information sources (e.g. textual, numerical, verbal, graphical).

D2 Communicate appropriately and effectively to a variety of audiences in written, verbal and graphical forms.

D3 Appreciate issues of sample selection, accuracy, precision and uncertainty during collection, recording and analysis of data in the field and laboratory.

D4 Prepare, process, interpret and present data, using appropriate qualitative and quantitative techniques and packages, including geographic information systems.

D5 Solve numerical problems using computer and non-computer based techniques.

D6 Work with incomplete information and technical uncertainty.

D7 Search for and use the scientific literature effectively, using the internet critically as a means of communication and a source of information.

D8 Take notes effectively.

D9 Work on projects, both individually and as a member of a team.

D10 Identify individual and collective goals and responsibilities and perform in a manner appropriate to these roles.

D11 Recognise and respect the views and opinions of other team members.

D12 Evaluate performance as an individual and a team member.

D13 Have developed the skills necessary for self-managed and lifelong learning (e.g.

working independently, time management and organisational skills).
D14 Have identified and be working towards targets for personal, academic and career development.
D15 Have developed an adaptable and flexible approach to study and work.
D16 Monitor and adjust a personal programme of work.
D17 Independently learn new theories, concepts, methods etc. in unfamiliar situations.

For Students on the Careers Placement Year programme:

D18 Reflect on and manage own learning and development within the workplace.
D19 Use existing and new knowledge to enhance personal performance in a workplace environment, evaluate the impact and communicate this process.
D20 Use graduate skills in a professional manner in a workplace environment, evaluate the impact and communicate the personal development that has taken place.

Teaching and Learning Methods

Many of the transferable skills are practised in the numerous coursework exercises students must undertake and advice on specific aspects will be given in particular modules (D1-D17). The individual and group projects require students to gather information, search literature and recognise and develop areas where their knowledge may be deficient (D1-D17). The Advanced Study Skills or Residential Field Course coursework is a good example of the above, which is carried out in groups and forces the teams to not only use information they have been given, but also to search out and understand aspects of their work on which they have received no instruction.

For the MEarthSci Programme, the research project in stage 4 will require students to further their understanding in specific specialised areas and to project manage their individual work and report submission (D1-D17).

Assessment Strategy

Most pieces of coursework will include an element to cover transferable skills and a number of modules require students to make oral presentations to an audience, which will also contribute to the assessment for the particular modules. Many of these skills are also assessed in the major individual project that all students undertake.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

The normal Undergraduate year is approximately 31 weeks, arranged in three terms and currently divided into two semesters. The MEarthSci programme normally lasts four years, and the BSc programme three years, although it is possible to take a gap year with the approval of the Head of School. The only part-time study is limited provision under exceptional circumstances.

Every Honours student studies 120 credits in each Stage (year), resulting in MEarthSci candidates completing 480 credits and BSc candidates completing 360 credits. Candidates must complete one Stage before proceeding to the next.

There is a Faculty Foundation Year for candidates not adequately qualified to embark on Stage 1 of engineering degree programmes, which may be extended to these programmes.

Students may transfer between BSc and MEarthSci programmes at the end of Stage 2. Students must achieve a threshold Stage 2 average mark of 55% to progress on the MEarthSci programme.

Students on the Careers Placement Year will take their placement in the penultimate year of studies. (MEarthSci students will take their placement year between stages 2 & 3)

110 credits of modules at Stage 1 and 2 are compulsory on both programmes. At Stage 3, 70 credits are compulsory, with 50 credits of optional modules. At Stage 4, students on the MEarthSci programme take a compulsory 10 credit module on Professional Development and a 60 credit Research Project. They then select further credits from a range of discipline-based optional modules so that the total number of credits for this stage is 120.

Key features of the programme (including what makes the programme distinctive)

The Earth Science programmes are integrated programmes with sustainable development at their heart, engaging with the environmental, social and economic dimensions of this unifying concept within the Earth system.

The aim of the programme is to give graduates a sound first degree-level education in the Earth Sciences that can be used in a variety of ways in later life for the benefit of the individual and society. Graduates will have had the opportunity to develop an understanding of the fundamental processes that shape the Earth as a dynamic planet, of geological time, of three dimensional spatial relationships at a variety of scales, of the occurrence and distribution of geological natural resources, including fuels, minerals and water, and of the management of geological systems in the context of human activities, including civil engineering. This challenges students to think not only about the technically demanding subjects but also about the future challenges of climate change, sustainable development, democracy, equity, poverty alleviation, and the lifelines of energy, food and water.

To this end, the programmes are essentially delivered under four themes: Environmental Systems; Geomatics; Geology/Geotechnics; Geochemistry. Fieldwork is central to the programmes, which challenge the students to integrate all of the knowledge gained in the three themes within a holistic sustainable development framework that focuses on the delivery of sustainable solutions at a range of scales within the Earth system.

Within the themes at Stages 1 to 2, the programmes provide a basis in each of the disciplinary pillars on which the training of all Earth Scientists must be founded. At Stage 3, students on the BSc programme have the opportunity to specialise in their individual project.

Students on the MEarthSci programme have the opportunity to specialise in one of seven discipline strands (environmental consultancy, petroleum geochemistry, engineering geology/geotechnics, hydrogeology and water management, environmental science, clean technology or REEM) for a substantial part of Stage 4, including an individual research project.

In designing and delivering the programme, strong links with industry are crucial to ensure that our programme is aligned with industry trends and that graduates emerge with the skill sets that industry needs and the capacity to tackle the challenge of sustainable development in the 21st century. Our many other industrial collaborators also provide guest speakers, site visits, project support, and an increasing number of industrial placements.

The programme includes training in key specific practical components that are unique to the geosciences, so that graduates are equipped to seek work that leads to professional status as a Chartered Geologist. Graduates will be well equipped to enter a range of employment sectors that appreciate the transferability and value of skills (team working, the ability to work alone, observational and analytical skills, numeracy and the ability to interpret the unknown from limited data) gained through an education in the Earth Sciences.

All BSc and MEarthSci students have the opportunity to undertake a Year in Industry if they can secure a placement and demonstrate suitable performance and motivation by the end of Stage 1, which is again reviewed at the end of Stage 2. In addition to their own research and use of the resources offered via the University Careers Service, our Industrial Liaison Officer will support students in their efforts to secure a placement. Some students will therefore transfer between programmes with and without the Year in Industry.

For students on the MEarthSci programme who can demonstrate suitable performance and motivation by the end of Stage 2, there may be opportunities to study Stage 3 abroad at an approved institution, usually with teaching in English (e.g. Sweden, Singapore, Hong Kong, Calgary and Colorado), dependent on availability of suitable equivalent modules.

Programme regulations (link to on-line version)

-RF640+.pdf (ncl.ac.uk)
-RF641+.pdf (ncl.ac.uk)

13 Support for Student Learning

Generic information regarding University provision is available at the following link.

Generic Information

14 Methods for evaluating and improving the quality and standards of teaching and learning

Generic information regarding University provision is available at the following link.
Generic Information

Accreditation reports
The Earth Science programmes will seek accreditation by the Geological Society of London (GeolSoc) for fully satisfying the educational base for a Chartered Geologist (CGeol). See https://www.geolsoc.org.uk/ for further information and details of further learning for GeolSoc. The Earth Science programmes will also seek accreditation by the Royal Institution of Chartered Surveyors (RICS) for fully satisfying the educational base for a Chartered Surveyor. See http://www.rics.org/uk/ for further information and details of further learning for RICS.

Additional mechanisms
Strategic and pedagogical review takes place annually via School Teaching Away Days.

15 Regulation of assessment

Generic information regarding University provision is available at the following link.
Generic Information

In addition, information relating to the programme is provided in:

The University Prospectus: http://www.ncl.ac.uk/undergraduate/degrees/#subject
Degree Programme and University Regulations: http://www.ncl.ac.uk/regulations/docs/

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided.