Programme Specification (Undergraduate)

For students entering in 2019/20

Date amended: January 2018

1. Programme Title(s) and UCAS code(s):

BSc Geology with Geophysics F660

BSc Geology with Geophysics with a Year in Industry *

* Selected when on course

2. Awarding body or institution:

University of Leicester

3. a) Mode of study:

Full time

b) Type of study:

Campus-based

4. Registration periods:

The normal period of registration is three years (four years with a Year in Industry)

The maximum period of registration is five years (six years with a Year in Industry)

5. Typical entry requirements:

A-level: ABB including at least two from: Biology, Chemistry, Computer Science, Environmental Science, Geography, Geology, Maths or Physics. At least one A Level must be Physics or Mathematics.

BTEC Diploma: DDD in appropriate subject area.

Access to HE courses in Science and Engineering: 45 L3 credits, including 30 at Distinction and remaining L3 credits at least at Merit.

International Baccalaureate: Pass diploma with 30 points including maths or physics at higher level.

6. Accreditation of Prior Learning:

APL will not be accepted for exemptions from individual modules, however may be considered for direct entry to year 2, on a case by case and subject to the general provisions of the University APL policy.

7. Programme aims:

The programme aims to

1) provide students with a breadth of knowledge of geology and solid-Earth geophysics, and exposure to some areas of research at the cutting edge of the Earth Sciences;
2) provide students with a thorough understanding of the theoretical and practical applications of geology and geophysics in the study of the Earth, and environmental and societal issues;
3) equip students with transferable and subject-specific skills necessary for a career in the Earth Sciences, other science based industries, education, and for training at management levels in other professions;
4) promote the development of ICT and written, oral and presentation skills appropriate for a science graduate at the Bachelors level;
5) stimulate students to develop a wide range of independent and team skills;
6) ensure that students benefit from a programme of work in the field, developing fundamental

geological and geophysical knowledge through observation, measurement and critical analysis, as well as developing personal and character skills;

7) provide students, via the curriculum and research expertise of staff, with the intellectual development and stimulus for research and further study at a post-graduate level;
8) provide students with the environment in which to develop their interest in geology and geophysics;
9) enthuse and motivate all students to achieve their full potential in their degree course.

In addition, for the 'with Industry' variants

- To provide experience of applications of geology and other professional skills in Industry and to reinforce knowledge through their use in different environments

8. Reference points used to inform the programme specification:

QAA Benchmarking Statement: Earth sciences, environmental sciences and environmental studies (2014)

Degree programmes broadly concerned with earth sciences

2.4 It is anticipated that all graduates have appropriate knowledge of the main aspects of the Earth sciences, as listed:

- A holistic view of the present and past interactions between components of the Earth system, including the effects of extra-terrestrial influences on these interactions.
- The cycling of matter and the flows of energy into, between and within the solid Earth, the Earth's surface, the hydrosphere, the atmosphere and the biosphere.
- The study of the biological, chemical and physical processes that underpin our understanding of the structure, materials and processes relevant to the Earth and planetary bodies.
- The central paradigms in the Earth sciences: uniformitarianism (the present is the key to the past); the extent of geological time; evolution (the history of life on Earth); and plate tectonics
- Geological time, including the principles of stratigraphy, the stratigraphic column, the methods of geochronology, the rates of Earth processes, major events in Earth history, the evolution of life as revealed by the fossil record, the Quaternary and Anthropocene.
- Collection and analysis of Earth science data in the field, and the appropriate presentation, manipulation and extrapolation of these sometimes incomplete data in both two and three-dimensions, including the generation of geological maps and cross sections.
- The study of structures, materials and processes that includes an appreciation of temporal and spatial variations at appropriate scales.
- The study of the structure, the composition and the materials of the solid Earth (core, mantle, crust, asthenosphere, lithosphere and so on), the hydrosphere, the atmosphere, the cryosphere and the biosphere, and the processes operating within and between them.
- An understanding of other planetary bodies.
- Earth science terminology, nomenclature and classification of rocks, minerals, fossils, and geological structures.
- The identification of rocks, minerals, fossils, and geological structures.
- Surveying and measurement both in the field and laboratory, and using quantitative and instrumental techniques.
- An awareness that the understanding and knowledge gained from the subject and its application has to be considered within a wider socio-economic and environmental context.

2.5 Typical programme elements might include: engineering geology; geochemistry; geological mapping; geomorphology; geophysics; geographic information systems and remote sensing applications; hydrogeology; igneous and metamorphic petrology, local and global tectonics; mineralogy; mineral deposits; natural hazards;; palaeobiology; palaeoclimatology;

palaeontology; petroleum geology; petrology; sedimentology; stratigraphy; and structural geology.

2.6 Applications of the subject areas might include the exploration, development and remediation/storage of Earth resources (eg hydrocarbons, minerals, water, carbon dioxide sequestration, aggregates & radioactive waste), using past climates to understand climate change and the impact on the environment and society, civil engineering projects (e.g. land restoration, site investigations and waste disposal and understanding geohazards (e.g. flooding, earthquakes, volcanic eruptions and landslides.In addition, the Programme Specifications were informed by:

- QAA Frameworks for Higher Education Qualifications in England Wales and Northern Ireland
- QAA Benchmarking Statement
- PDR report (2013)
- University Learning Strategy
- University Employability Strategy
- University of Leicester Academic Audit Evaluation
- NSS
- First Destination Survey
- External Examiner's Reports
- Accreditation by the Geological Society of London http://www.geolsoc.org.uk/en/Education%20and%20Careers/Universities/Degree%20Accreditation/First%20Degree%20Programmes%20in%20Geoscience/Currently%20Accredited%20First%20Degree%20Programmes

9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Discipline specific knowledge and competencies		
(i) Mastery of an appropriate body of knowledge		
Discuss and explain the general principles and techniques of Geology, including the structure, composition and evolution of the Earth and its interrelationships with the hydrosphere, cryosphere, biosphere, and atmosphere; and the perturbations of these systems by extraterrestrial influences.	Lectures; Tutorials; Practical classes; Seminars; Field Courses; Demonstrations; Example sheets; Resource-based learning; Directed reading; Problem-solving classes.	Written and practical examinations, including short-answer and essay examinations; Problem-based examinations; Coursework; Module tests; Essays; Assessment of field reports and maps; Poster presentations; Field notebooks; Problem-based exercises
Describe classical physics as applied to studying earth structure, including gravity, magnetics, electromagnetics, stress, strain, dynamics, waves and radioactivity.	Lectures; Tutorials; Practical classes; Seminars; Field Courses; Demonstrations; Example sheets; Resource-based learning; Directed reading; Problem-solving classes.	Written and practical examinations, including short-answer and essay examinations; Problem-based examinations; Coursework; Module tests; Essays; Assessment of field reports and maps; Poster presentations; Field notebooks; Problem-based exercises
Process and interpret geophysical data by using appropriate mathematical techniques.	Lectures, set texts, in-house course materials.	Assessed coursework, module tests, examinations.
Describe the techniques for geophysical exploration and their application at all scales, from near-surface to whole-Earth.	Lectures, seminars, learned papers and literature, and in-house course material, fieldwork.	Assessed coursework, examinations

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(ii) Understanding and application of key concepts and techniques		
Describe, identify and interpret a range of geological materials in the laboratory and field; select appropriate techniques to enable this; and explain geological relationships.	Lectures; Tutorials; Practical classes; Field Courses; Demonstrations; Example sheets; Resource-based learning; Directed reading.	Written and practical examinations, including short-answer and essay examinations; Problem-based examinations; Field notebooks.
Examine, record and interpret the geology (*senso lato*) of a region via a range of field-based techniques.	Lectures; Tutorials; Practical classes; Field Courses; Demonstrations; Independent field work.	Practical examination; Report and field notebook and map assessment
Explain geological time, rates and fluxes, and the techniques required to determine them.	Lectures, Tutorials, Practical classes; Seminars; Field Courses; Demonstrations; Example sheets; Resource-based learning; Directed reading; Problem-solving classes.	Written and practical examinations, including short-answer and essay examinations; Problem-based examinations.
Select geological knowledge and data for modeling purposes (for example, for evaluation of scientific hypotheses, for hazard mitigation, or for resource estimation).	Lectures; Tutorials; Practical classes; Field Courses; Demonstrations.	Written and practical examinations, including short-answer and essay examinations; Problem-based examinations; field notebooks.
Describe the importance of geological materials resources, their exploitation and associated environmental impact.	Lectures, practical classes, tutorials, field courses	Exam and group work.
Observe, measure and record the physical properties of the Earth using geophysical techniques (including field techniques).	Lectures, seminars and practicals; staffed and independent fieldwork	Assessed coursework, examinations, field reports, notebooks.
Apply mathematical methods in trigonometry, statistics, calculus, matrices, vectors, tensors and data inversion.	Lectures, tutorials, seminars and workshops	Assessed coursework and examinations.
Demonstrate and apply knowledge of safety procedures in the field.	Field-based practical classes and demonstrations	Completion of risk assessments; Demonstration and role play; Application during Field Courses.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(iii) Critical analysis of key issues		
Identify theories paradigms, concepts and principles; apply scientific principles to evaluate current geological paradigms; and evaluate environmental and societal aspects of the Earth's resources.	Lectures; Tutorials; Practical classes; Field Courses; Demonstrations; Example sheets; Resource-based learning; Directed reading.	Written and practical examinations, including short-answer and essay examinations; Problem-based examinations; Coursework; Module tests; Essays; Tutorial discussions; Dissertations.
Explain, summarise and apply accuracy and precision, sampling, signal-processing, mathematical treatment of physical fields.	As above	As above
(iv) Clear and concise presentation of material		
Synthesise and interpret results, in order to effectively communicate (*via* written, oral, graphical means) data and ideas to a range of audiences.	Tutorials; Group seminars; Practical classes	Essays, essay-based examinations; independent projects; contributions to tutorial discussions; poster displays; reports; group talks.
(v) Critical appraisal of evidence with appropriate insight		
Debate geological ideas. Construct and test scientific hypotheses and analyse using geological and geophysical data.	Lectures; Tutorials; Practical classes; Seminars; Field Courses; Demonstrations; Directed reading; Problem-solving classes.	Essays; essay- and practical examinations; reports; presentations; Dissertations.
(vi) Other discipline specific competencies		
Conduct a range of field-based studies (e.g. geological mapping and recording of field observations).	Field courses, practical classes and demonstrations.	Report, field notebook, and geological map. Practical examinations.
Develop responsibility for the immediate working environment.	Field-based classes and projects.	Staff-monitoring of hazard assessment forms. Assessment of fieldwork.
Describe risks for hazard assessment for field-based work. Identify safe practice.	Field-based classes and projects.	Staff-monitoring of hazard assessment forms. Assessment of fieldwork.
Explain the geological structure and history of an area.	Field classes, lectures, practical classes.	Independent field project report.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
	(b) Transferable skills	
	(i) Oral communication	
Present geological data and theories using appropriate methods.	Tutorials; Group seminars/discussions; field-based presentations.	Oral presentations in tutorials and classes.
Discuss and review geological topics in tutorial and other group discussions, and respond effectively to questioning.	Tutorials; Group seminars/discussions; field-based presentations.	Oral presentations in tutorials and classes
	(ii) Written communication	
Communicate effectively and appropriately in a variety of written formats including essays, reports, projects, CVs and posters	Tutorials, demonstrations and guidance notes	Assessed essays, reports, poster displays, and examinations
Draw and describe geological features, specimens and thin sections.	Practical classes, demonstrations, fieldwork, independent project work	Field notebooks; assessed practical folders; assessed reports.
Express arguments or proofs in mathematical form	Lectures, practical classes and demonstrations, fieldwork, independent project work.	Reports, examinations.
	(iii) Information technology	
Use spreadsheets or other software to enter, manipulate and display numerical data.	Subject-embedded exercises. Tutorials.	Assessed report; practical assignments.
Use appropriate software packages to prepare written reports, essays, dissertations, posters and presentations (e.g. Word, PowerPoint)	Report-writing for tutorials; subject-embedded exercises; presentation to tutorial groups and classes.	Assessed report; tutorial and practical assignments; independent work assignments.
Record and analyse data, including from field equipment with digital memory, and downloading data to PC.	Practicals, project work, laboratory work and fieldwork.	Tutorial feedback, assessment of notebooks, project work and reports.
Competent processing and presentation of data.	Practicals, project work, laboratory work and fieldwork.	Tutorial feedback, assessment of notebooks, project work and reports.
Critically review information from electronic sources.	Tutorial and class supported information retrieval for projects, essays and reports and dissertations.	Assessed report; tutorial; practical assignments and independent work assignments.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(iv) Numeracy		
Select appropriate numerical, statistical and graphical methods to explain and interpret geological concepts.	Introduced in the first year within practical classes and tutorials.	Mid-semester progress tests and as components within subject specific modules throughout the three years of study; feedback on practical class assignments.
Apply mathematics in geophysical data reduction and interpretation.	Numerical problem classes, field classes, tutorials.	Feedback on practical and tutorial problems. Assessment of field/project reports.
Process numerical data and to solve numerical problems, with or without the use of a computer.	Practical classes and project work	Examinations and project work
(v) Team working		
Organize and work effectively within a team, and evaluate performance of self and of team.	Tutorials, seminars, practical classes, project work, and field-based discussions.	Tutorial-based assessments; assessed practical work, and team fieldwork.
Identify self and team goals and responsibilities for team working.	As above.	As above.
(vi) Problem solving		
Solve numerical, spatial, temporal and geometrical problems.	Lectures, tutorials, practical and field classes, group work, projects.	Assessment of field notebooks, practical class work, project work and reports.
Solve problems with incomplete or contradictory information.	As above	As above.
(vii) Information handling		
Effectively search for, gather and utilise information relevant to geological problem solving.	Lectures, tutorials, practicals, study skills within tutorials, field and lab-based projects.	Tutorial assignments, project work.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(viii) Skills for lifelong learning		
Demonstrate intellectual independence	All of the above, and particularly independent project work.	Assessed independent work. Coursework within modules
Develop and implement a personal plan of work to meet a deadline.	All of the above, and particularly independent project work.	Assessed independent work.
Identify targets for personal, career and academic development.	All of the above, and particularly independent project work and tutorials.	Assessed independent work. Successful Placement for Year in Industry Students

10. Progression points:

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course.

For Year in Industry Variant:

Progression onto the Year in Industry placement preparation module will require a 1st year CWA of 50%. Students who undertake the placement preparation module, but do not obtain a placement or do not satisfactorily complete (attendance, participation and completion of set tasks) the placement year will be transferred to the standard degree programme.

11. Scheme of Assessment

The programme follows the standard scheme of award and classification set out in Senate Regulation 5.

12. Special features:

- Residential field courses
- Group problem solving
- Student centered learning – small-group tutorials
- Field-based project
- Accessible, extensive mineral, rock and fossils undergraduate teaching collections
- Practical applications of geophysics using a range of equipment
- Department-based specialist careers advisors

Placements

Students undertake a year in industry between the second and third years of their programme. Progression onto the Year in Industry placement preparation module will require a 1st year CWA of 50%. Students who undertake the placement preparation module, but do not obtain a placement or do not satisfactorily complete (attendance, participation and completion of set tasks) the placement year will be transferred to the standard degree programme.

As a condition of the 'with Industry' programme, students are required to undertake preparatory training during the second year of their degree.

Students are responsible for securing their own placement but will receive support in this from the Career Development Service. .

Once in placement, students will need to register their University 'attendance' by logging on to a dedicated Blackboard site once a week. In the course of the placement the student will receive one or two visits from a member of staff. The second 'visit' can be in the form of a Skype call. Should a student secure an overseas placement both visits will typically be delivered via a Skype call.

While in placement, students will be required to complete an online log. The placement log requires students to undertake reflective activities which are marked on a pass/fail basis. This, together with the final summative reflective report, constitutes the assessment for the placement year. Students have to submit the final report within one month of finishing the placement, and are allowed to resubmit once if required.

If a student fails to secure a placement or does not meet the academic progression requirements at the end of year 2, they will be transferred to the non-industry variant of their degree programme.

13. Indications of programme quality

Accreditation by the Geological Society of London
The research interests of the staff strongly inform the teaching programme.

Quotes from recent External Examiners:
'The department is excellent and deserves its reputation as one of the leading centres of geoscience teaching/research in Europe.'
'One the great strengths of the Geology with Geophysics course at Leicester has been its integrated nature. Students use the principles of geophysics to address geological problems in a user-friendly way that considers both the pure and applied side of the subject.'
'The quality of the Geophysics degree programme is very high and it consistently produces graduates with relevant, transferable skills and professional attitudes.'

14. External examiners

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports can be found here.

Appendix 1: Programme structure (programme regulations)

BSc GEOLOGY WITH GEOPHYSICS

FIRST YEAR MODULES		
Core Modules		**Credits**
	YEAR LONG	
GL1100	Tutorials	15
GL1101	The Rock Cycle: our dynamic earth	30
	SEMESTER 1	
GL1102	Micro to Macro	15
GL1103	Palaeobiology and the Stratigraphic Record	15
	SEMESTER 2	
GL1104	Natural Resources and the Environment	15
GL1105	Geological Maps and Structures	15
GL1106	Introductory Field Course	15
SECOND YEAR MODULES		
Core Modules		**Credits**
	YEAR LONG	
GL2100	Geological Field Skills	30
GL2108	Principles of Geophysics	15
	SEMESTER 1	
GL2103	Magmatic and Metamorphic Processes	15
GL2105	Depositional Processes and Environments	15
	SEMESTER 2	
GL2104	Interpreting Geological Maps and Stratigraphy	15
GL2101	Earth and Ocean Systems	15
GL2102	Structure and Tectonics	15
THIRD YEAR MODULES		
Core Modules		**Credits**
	SEMESTER 1	
GL3100	Field Based Project	30
GL3112	Geophysical Data Analysis	15
	SEMESTER 2	
GL3101	Dissertation	15
GL3107	Reflection Seismology	15
GL3115	Archaeological Geophysics Field Course	15
Optional Modules		**Credits**
(To choose 15 credits)	**SEMESTER 1**	
GL3102	Environmental Geoscience	15
GL3103	Petroleum Reservoir Petrophysics	15
GL3104	Concepts in sedimentology and stratigraphy with applications to	15

	reservoir geoscience	
(To choose 15 credits)	**SEMESTER 2**	
GL3105	Earth Science in Education	15
GL3106	Planetary Science	15
GL3108	Geological Application of Microfossils	15
GL3109	Mineral Exploration and Evaluation	15
GY3434	Stable Isotopes in the Environment	15

BSc GEOLOGY WITH GEOPHYSICS

FIRST YEAR MODULES		
Core Modules		**Credits**
	YEAR LONG	
GL1100	Tutorials	15
GL1101	The Rock Cycle: our dynamic earth	30
	SEMESTER 1	
GL1102	Micro to Macro	15
GL1103	Palaeobiology and the Stratigraphic Record	15
	SEMESTER 2	
GL1104	Natural Resources and the Environment	15
GL1105	Geological Maps and Structures	15
GL1106	Introductory Field Course	15
SECOND YEAR MODULES		
Core Modules		**Credits**
	YEAR LONG	
GL2100	Geological Field Skills	30
GL2108	Principles of Geophysics	15
	SEMESTER 1	
GL2103	Magmatic and Metamorphic Processes	15
GL2105	Depositional Processes and Environments	15
	SEMESTER 2	
GL2104	Interpreting Geological Maps and Stratigraphy	15
GL2101	Earth and Ocean Systems	15
GL2102	Structure and Tectonics	15
	YEAR LONG	
ADGL2200	Placement Preparation	0
THIRD YEAR MODULES		
Core Modules		**Credits**
	SEMESTER 1	
GL3100	Field Based Project	30
GL3112	Geophysical Data Analysis	15

	SEMESTER 2	
GL3101	Dissertation	15
GL3107	Reflection Seismology	15
GL3115	Archaeological Geophysics Field Course	15
Optional Modules		**Credits**
(To choose 15 credits)	**SEMESTER 1**	
GL3102	Environmental Geoscience	15
GL3103	Petroleum Reservoir Petrophysics	15
GL3104	Concepts in sedimentology and stratigraphy with applications to reservoir geoscience	15
(To choose 15 credits)	**SEMESTER 2**	
GL3105	Earth Science in Education	15
GL3106	Planetary Science	15
GL3108	Geological Application of Microfossils	15
GL3109	Mineral Exploration and Evaluation	15
GY3434	Stable Isotopes in the Environment	15

THIRD YEAR

Students who gain an industry placement will be assessed as per the standard model for undergraduate placements in the College of Science and Engineering. The marks from this year will not be included in the final degree assessment.

Appendix 2: Module specifications

See module specification database http://www2.le.ac.uk/offices/sas2/courses/documentation

Appendix 3: Skills matrix