PART IA
COURSE GUIDE 2018-19

Contents
1. Introduction to the Course ...................................................... 2
2. Department of Earth Sciences Map ........................................... 3
3. Navigating the Department ..................................................... 4
4. Departmental Facilities .......................................................... 5
5. Types of Teaching: ................................................................. 6
   (i) Lectures ........................................................................ 6
   (ii) Practical classes .......................................................... 6
   (iii) Online resources ......................................................... 7
   (iv) Field trips ................................................................... 7
   (v) Supervisions .................................................................. 8
6. Lectures and Reading Lists ...................................................... 9
7. Examinations .......................................................................... 10
8. Marking Criteria ..................................................................... 11
9. NST Approved Calculators .................................................... 12
10. Lab Safety and Conduct ....................................................... 13
11. Feedback Processes and Complaint Procedures ..................... 14
12. Earth Sciences and Disability ................................................ 16
13. Careers following a Degree in Earth Sciences ....................... 17
14. Transferable skills in Earth Sciences ...................................... 18
15. Plagiarism Statement ............................................................ 20

IA Earth Sciences Guide 2018-198-19
1. Introduction to the Course

Welcome to 1A Earth Sciences where you will be introduced to the physical, chemical and biological principles that have shaped our planet over its 4.5 billion-year history providing a gateway into planetary science. By the end of the year you will be equipped with a different way of thinking about problem solving in science and an ability to determine quickly, the key scientific principles underlying complex phenomena. Where and why do rocks melt and form volcanoes? What controls Earth’s climate? How do we know the composition of the core? What controls earthquakes? Your laboratory is not only here in Cambridge, but the entire planet Earth, with our students exploring as far and wide as from the Himalaya to the Arctic to make their own observations. We will take you on field trips from Scotland to Greece and Spain. You will learn to set the boundary conditions of real research questions by making your own observations. Researchers in our department range from theoretical mathematicians and physicists to isotope geochemists to evolutionary biologists bringing together an unrivalled diversity of thought together in one course to shape your way of thinking about our planet, solar system and beyond.

Dr Ed Tipper (Course Coordinator)
ett20@cam.ac.uk
2. Department of Earth Sciences - Map
3. Navigating the Department

- The main building of the Department comprises a North Wing fronting onto Downing Street, an East Wing, bordering Downing Place, and a South Wing protruding into the Downing Site. The plan on page 2 shows this layout, the locations of the facilities mentioned below, and the access routes to them.

- Earth Sciences IA lectures are held in the Physiology Lecture Theatre immediately adjoining the South Wing of Earth Sciences.

- The IA Earth Sciences Laboratory is on the second floor of the East Wing. The nearest toilets are at the top (332 & 334) and bottom (32A & 32B) of the East Wing staircase.

- The IA Earth Sciences Teaching Office is staffed by Ben Froste in Room 217 (bf268@cam.ac.uk), off the lobby at the back of the IA Lab. Ask here for practical registration, missed handouts, copies of old exam papers or for practical needs outside the advertised practical times.

- The Teaching Support Manager, Helen Averill, is in Room N14 off the Common Room, and can be contacted on hpd20@cam.ac.uk. Speak to Helen anything related to the course, teaching and field trips. Mitha Madhu (mm853@cam.ac.uk) is the Teaching Assistant and can also assist with general course enquiries.

- Other lecture theatres and teaching laboratories used for teaching in Parts IB, II and III are labelled on the plan.

- The Earth Sciences Library is on the second floor of the North Wing. The librarian, Sarah Humbert (shum05@esc.cam.ac.uk), has an office just inside the Library entrance.

- Reception for Earth Sciences is on the ground floor of the North Wing.

- The Common Room is also on the ground floor of the North Wing. There is a snack machine in the lobby at the east end of the Common Room and a drinks machine near Reception.

- The Kitchen is opposite Reception. Get drinking water here rather than from taps in the toilets. Please take water in bottles rather than cups to avoid spills in the labs.

- The main toilets are located a) on the ground floor at the bottom of the East Wing staircase, b) on the South Wing staircase (Gents and Women on alternate floors), c) at the top of the East Wing staircase. There is a toilet with disabled access near Reception.

- All staff, postgraduates, Part II and III students have pigeonholes or mail folders in the North Wing Foyer next to Reception.

- Most of our communication with you will be via e-mail. Please ensure that you check your @cam.ac.uk account regularly and respond promptly when necessary.
4. Departmental Facilities

Although you will spend most of your time in the IA lab or the Physiology Lecture Theatre, there are several other facilities that you may find useful:

- **The Common Room** is on the ground floor of the North Wing. You are welcome to buy a coffee or tea, which are available from the vestibule near Reception from 10.30-11.30am and 15.30-16.30pm. The Common Room is also available for you to use as a quiet area at most times of the day, but please be prepared to clear tables for others to use for coffee from 10.30-11.30am each day. There is a drinks machine in the entrance hall near Reception and a snack machine at the far end of the Common Room, just outside the doors.

- **The Earth Sciences Library**, on the second floor of the north wing, holds teaching material of most use to students in Parts IB, II and III. Your College library should hold the relevant books for Part IA, and it is the responsibility of your DoS in Earth Sciences to keep the College library up to date. However, if you have a specialist requirement or want to borrow from the short-loan teaching collection, please consult the Earth Sciences Librarian in her office inside the Library entrance. You will need a University Library card to borrow material. You are also welcome to use the Earth Sciences Library for private study. Rarely, students from second and later years may need to be given priority for the limited seating space and computer facilities available.

- **The Sedgwick Museum**, with its entrance on the 1st floor of the North Wing, has a large collection of fossil, rock and mineral material relevant to the IA course. Admission is free and you are encouraged to look round the museum at any time.

- **The Sedgwick Museum Shop**, immediately inside the museum entrance, sells geological equipment and some books. They have the good-value handlenses, something that you must have to get the most out of practicals and field trips. The shop also sells a wide range of specimens and gifts: an inflatable dinosaur may be just the birthday present for that ‘difficult to buy for’ relative!

- **The Sedgwick Club**, the student geology society, arranges evening talks, field trips, and social events. Their officers provide the student representatives on the Teaching Liaison Committee. Whilst run mainly by Part II/III and IB students, the club welcomes interested IA Earth Sciences students. You will find information on contacts and events at [http://sedgwickclub.soc.srcf.net](http://sedgwickclub.soc.srcf.net).
5. Types of Teaching

Our teaching takes place in five main ways; lectures, practical classes, via the internet, field trips and supervisions. It is important that you understand the objectives of each mode of teaching and what your role is in their success.

(i) Lectures

Lectures are relatively formal presentations to large classes. IA Earth Sciences lectures are scheduled for **1100–1200 on Monday, Wednesday and Friday** in the **Physiology Lecture Theatre**. Despite their hourly time-slots, all NST lectures conventionally begin at five minutes past the hour and end at five minutes to the hour. You are expected to attend all lectures: they contain the essential material that you need to know for examinations, some of which cannot be found in textbooks. Note: Mobile phones **must** be switched off during lectures.

You should expect teaching styles to vary between courses and between lecturers. All lecturers issue handouts of prepared lecture notes and diagrams, but you should not expect them to structure their lectures to conform precisely to this material. Some lecturers will expect you to supplement this material with your own notes. The lecturer should make their teaching and learning strategy clear to the class, although you should use the methods that you feel will best enable you to understand and learn the material. There is usually no opportunity to ask questions during the lecture, but the lecturer may be able to answer short queries immediately afterwards.

A synopsis of the whole IA Earth Sciences lecture and practical course is included in this guide. There is no syllabus for the course, but the lecture notes provide a guide to the range of topics on which you can expect to be examined.

(ii) Practical classes

Practicals are held in the **IA Earth Sciences Laboratory** (East Wing, second floor), in smaller groups than the associated lectures. You do **three 1-hour classes each week**. On registration, you should have been assigned to one 1-hour period from each of sets A, B and C.

**SET A:** Friday 12-1pm, or Saturday 10-11am, or Monday 9-10am, or Monday 10-11am  
**SET B:** Monday 12-1pm or Tuesday 10-11am, or Wednesday 9-10am, or Wednesday 10-11am  
**SET C:** Wednesday 12-1pm, or Thursday 10-11am, or Friday 9-10am, or Friday 10-11am

If you are unable to attend **any** of these sessions for any reason, you MUST inform the relevant member of academic staff as soon as you are able.

Please be in the laboratory by five minutes past the hour scheduled for the start of your allocated class. There may be a short, spoken introduction or conclusion to each session, but during most of the class you will be working independently on a practical exercise involving geological materials. Staff and postgraduate demonstrators will be on hand to help you. They will be glad to answer questions both on the specific practical exercise and on related material from the lectures. The lecturers themselves are usually present in some of the related practical sessions. If you have comments on the content or organisation of
practicals, either tell the demonstrators, the head of the practical class (see Departmental Contacts), or use the comments book in the laboratory. These comments will be reviewed by the organizer of the class who will take any necessary action.

At the end of every part of the course we ask you to fill in an online questionnaire. This is another opportunity for comment on the content or structure of the lectures and practicals anonymously. It is essential that you complete these at the time. They are a pivotal way for us to improve delivery of our courses to you.

You will need a hand lens (x8 or x10) in many practicals and for field work. Hand lenses will be available for purchase from the Earth Sciences Teaching Office during your first week. Alternatively, the cheapest source of good hand lenses is in the Sedgwick Museum shop on the 1st floor of the Earth Sciences building above the Common Room.

(iii) Online resources

Moodle
An increasing amount of supporting material relating to IA Earth Sciences is available online. Current material includes this most lecture notes and slides, and many practical questions and answers. The hosting site is at https://www.vle.cam.ac.uk/. You should be registered automatically for access to the appropriate Moodle sites for your IA NST courses. You will intermittently receive emails via Moodle relating to arrangements for the course.

IA reference collection
The IA reference collection of rocks, minerals and fossils is a fantastic resource for practicing your practical skills and can be found in the IA lab but is also available to be browsed online at http://wserv3.esc.cam.ac.uk/1acollections/.

(iv) Field trips
There are two field trips for the IA Earth Sciences course:

Ketton Quarry: A half day trip early in the Michaelmas Term, 9th, 10th or 11th October 2018

Arran: A week on the Isle of Arran in one of three weeks in the Easter Vacation, One of:
Party A: Thursday 14th March to Friday 22nd March 2019
Party B: Thursday 21st March to Friday 29th March 2019
Party C: Thursday 28th March to Friday 5th April 2019

You should attend both of these trips. They provide valuable extra experience of geological principles and practice. Some exam questions focus on the geology on these trips. The trips are well staffed, and advice can be obtained abundantly and informally. Most of your costs are paid by the Department.

Even for the Ketton trip you will need some stout footwear, ideally walking boots or wellington boots, and a rain jacket. For the Arran trip you must have adequate outdoor
clothing and footwear: a good waterproof jacket and trousers, and boots for wet, rough terrain (not just trainers).

There is another field trip to note if you continue with Earth Sciences beyond IA. This is the Cumbria Mapping Course in Northwest England, nine days at the end of the Summer Vacation (late September). Attendance on this trip is strongly advised if you are carrying on to IB Earth Sciences and if there is a possibility that you will continue to Part II Earth Sciences.

Please note, it is essential that you attend the Field Safety seminar which will take place in Mid-June 2019. Further information will be distributed nearer the time.

(v) Supervisions

These are small classes, usually of between one and three students, with a member of the teaching staff or an experienced postgraduate. You should expect to get between 6 and 8 hours of supervision per term in each NST IA course that you are taking. Supervisions are an excellent opportunity to discuss the course material and to learn and practice examination skills. Most supervisors will regularly set you work to be handed in and assessed. Some of these exercises will require you to write answers in the form of short scientific notes. Your supervisor will guide you as to the style of these, but full advice is given in the appendix to this booklet on ‘Writing answers to Earth Sciences questions in supervisions and exams’.

Almost all supervisors for IA Earth Sciences are members of the Department. Although supervision teaching is arranged through your College, the Earth Sciences Department is concerned that it coordinates well with Departmental teaching, and has periodic meetings of Directors of Studies in order to achieve this.
6. Lectures and Reading Lists

The Lecture lists for Part IA, plus timetables can be found on the Moodle at https://www.vle.cam.ac.uk/. In addition, you can access the main university timetable at https://2018-19.timetable.cam.ac.uk/.

Reading lists will be available on Moodle, and lecture notes and other course documentation will be added Moodle throughout the year. The hosting site is at https://www.vle.cam.ac.uk/. Please speak to Helen Averill or Mitha Madhu if you require access although everyone should have access to the course pages from the beginning of Michaelmas Term.
7. Examinations

The Natural Sciences Tripos exam for IA Earth Sciences consists of two papers. These are taken in the main examination period, during the second half of the Easter Term (although some colleges may set exams at other times).

**Theory paper:** The theory paper is three hours long and divided into two sections. Section A will be a single compulsory calculation question, typically involving numerical or graphical analysis of data or concepts. From section B you will be asked to answer **four** questions chosen from eight or nine offered. You can expect about two questions for each half-term of the lecture course, although there may be questions covering different parts of the course. Calculation components to these questions are not precluded. 60% of the marks are allocated to the theory paper.

**Practical paper:** The practical paper is three hours long and comprises four compulsory questions taking three quarters of an hour each:

Q1 - Identification of 15 hand specimens of rocks, minerals, fossils or of photographs of geological features.
Q2 - Microscopic description and identification of rocks.
Q3 - Description, identification and interpretation of fossil material.
Q4 - Interpretation of a geological map.

40% of the total Earth Sciences marks are allocated to the practical paper.

You can take an approved NST calculator (see Section 9) plus appropriate writing and drawing equipment into the examination. You cannot take in any reference material, although a reference booklet is provided for Q2 of the practical exam.

Although there is no continuous assessment, the high proportion of marks attached to the practical exam means that you need to attend and make the most of the practical classes that we offer. It is difficult to get a good grade overall without doing well in the practical.

Earth Sciences is one of the subjects in IA NST that requires you to write answers in the form of short scientific notes for the theory paper. Guidelines on what is expected are provided in the document ‘Writing Answers to Earth Sciences Questions’. A guide to how marks are allocated is included in Section 8.

The IA Earth Sciences marking is done by a panel of four examiners, not necessarily staff who have taught the course in that year. Given the 60%/40% ratio of theory to practical marks, each theory question is effectively scored out of 12% and each section of the practical exam out of 10% of the total marks. No marks are awarded for missed questions. The raw total mark out of 100% is used to rank candidates by order-of-merit. The raw marks are then scaled ('norm-referenced') such that approximately 25% of candidates get a First Class (scaled mark ≥70), 65% get a Second (≥50) and 10% get a Third (≥40) or Fail (<40). The overall mark in IA NST is totaled using these norm-referenced unrounded subject marks, ensuring comparability between different subject combinations. Your College Director of Studies receives a breakdown of your marks into a theory and practical score for each subject.
### 8. Marking Criteria for answers in Earth Sciences written papers

<table>
<thead>
<tr>
<th>%</th>
<th>Class</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>1</td>
<td>Brilliant answer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exceptional understanding of subject and relevant literature.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outstanding critical analysis, full of insight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excellently organized, expressed and illustrated</td>
</tr>
<tr>
<td>80-89</td>
<td></td>
<td>Excellent understanding of subject.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Answer goes well beyond lectures.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effective critical analysis and grasp of relevant literature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well organized, expressed and illustrated.</td>
</tr>
<tr>
<td>70-79</td>
<td></td>
<td>Very good understanding of course material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sound evidence of outside reading.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some critical analysis.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well organized, expressed and illustrated.</td>
</tr>
<tr>
<td>60-69</td>
<td>2.1</td>
<td>Sound to good understanding of course material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited use of extra-course material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May contain minor factual errors or omissions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Well organized, coherent and adequately illustrated.</td>
</tr>
<tr>
<td>50-59</td>
<td>2.2</td>
<td>Based entirely on course material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lacks some detail in content.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contains significant factual errors or omissions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some deficiencies in organization, style or illustration.</td>
</tr>
<tr>
<td>40-49</td>
<td>3</td>
<td>Based imperfectly on course material.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contains numerous factual errors or omissions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Answer has merit but lacks a sound structure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concepts poorly expressed and illustrated.</td>
</tr>
<tr>
<td>30-39</td>
<td>Fail</td>
<td>Inadequate content, some maybe irrelevant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poorly organized, expressed and illustrated</td>
</tr>
<tr>
<td>20-29</td>
<td></td>
<td>An attempt at the question, but lacking most relevant content.</td>
</tr>
<tr>
<td>10-19</td>
<td></td>
<td>An answer with only isolated glimpses of relevant content.</td>
</tr>
<tr>
<td>0-9</td>
<td></td>
<td>A nearly worthless or irrelevant answer.</td>
</tr>
</tbody>
</table>

*Expectations of appropriate ‘critical analysis’ and ‘relevant literature’ will vary from year to year of the Tripos*
9. NST Approved Calculators

For Natural Sciences Tripos examinations Parts IA, IB, II and III (where a calculator is allowed), you will be permitted to use only the standard University calculator: CASIO fx 115 (any version), CASIO fx 50 (any version) or CASIO fx 991 (any version). Each such calculator must be marked in the approved fashion.

Approved calculators for the Natural Sciences Tripos can be purchased from the following locations (Note: these will be marked in the approved fashion:

Department of Chemistry
Faculty of Economics
Department of Physics, Bragg Building, Cavendish Laboratory

Approved calculators bought elsewhere will need to have the approved marking applied by the relevant Department.

You are strongly advised to purchase a calculator at the beginning of term.
10. Laboratory Safety and Conduct

General safety

- Food or drink must not be consumed in any laboratory with the exception of water in a capped bottle.
- All bags, coats and cycle helmets are to be kept off the benches.
- To allow unobstructed passage around laboratories all students’ personal possessions must be stowed under the benches or in the cubby holes provided.
- If the fire alarm sounds, you will hear a very loud continuously ringing bell. On the instructions of the demonstrator in charge of the class, you must leave the building and assemble on the lawn by the Department of Archaeology & Anthropology. Do not stop to collect personal belongings and do not re-enter the building until the fire brigade has given the all-clear.

Equipment and practical material

- Keep a minimum number of possessions on the bench tops, and try to keep them in order so that the risk of knocking samples onto the floor is minimised.
- Bench lamps must be lifted by their bases, not by the arms. Lifting by the arms can damage the pivoting mechanism.
- You will be instructed in the use of microscopes, and these instructions must be followed. Do not drag microscopes across the bench top; move them by safe lifting. Dragging the microscopes causes severe vibration, which leads to the optics becoming misaligned.
- When using microscopes and computers, check your seating position to ensure that you are at the correct height and, to avoid eye strain, look across the lab to allow your eyes to change focus every 20 minutes or so.
- Glass microscope slides must be treated with care. They are easily broken; some are irreplaceable, and all are expensive to replace.
- Handle ALL specimens with care. Many, especially the palaeontological material, are of museum display quality and are irreplaceable. Do not mark or scratch them unless you are specifically told you may do so.
- Ensure that all specimens, microscope slides, etc. are returned to the correct tray or drawer after use, and that any microscopes and bench lights are turned off before you leave the lab.
11. Feedback Processes and Complaint Procedures

Feedback processes

If you are concerned specifically about the quality or style of teaching that you are receiving, there are a number of additional avenues for your comments:

- **Comments books** are available in the laboratories, mainly for suggested improvements to the content and format of practical classes. The comments are acted on by the class organiser.

- **Online course questionnaires** are issued via Moodle at the end of each part of the course for you to assess the various components; lectures, practicals and supervisions pertaining to that subject. **Please take the time to fill them in.** They are evaluated by the course coordinator, who suggests improvements to individual lecturers or practical organizers or passes on comments on more strategic issues to the Department's Teaching Committee. Positive and negative feedback are both useful to us in assessing the effectiveness of courses.

- **A student representative** from each NST course taught by the Department sits on the Teaching Liaison Committee along with members of the Teaching Committee. Your representative will be appointed and introduced to your class before the end of the Michaelmas Term. The Teaching Liaison Committee discusses general teaching issues such as re-organisation of whole courses, provision of teaching resources, and co-ordination of University and College teaching. It passes recommendations on to the Teaching Committee, which has the central role in undergraduate teaching matters in the Department.

- **Feedback** on supervisions should be directed primarily through your College system. Concerns about your supervision arrangements should be voiced to your subject Director of Studies (ie in Earth Sciences or possibly Physical Sciences) or to your NST Director of Studies. Your Tutor may be able to advise you, if there are personal as well as academic issues involved. However, issues of supervision content and style are most effectively raised directly with supervisors themselves. Supervisions are meant to be individually tailored, and supervisors expect you to say if you are not getting the best value from them.

- **College questionnaires** provide another route for commenting on the supervision system. The Department will try to resolve major issues concerning supervisions, if College structures have failed to do so. Problems in particular Colleges can be dealt with by the Teaching Liaison Committee, although sensitive issues involving individual supervisors may be best discussed with the Chair of the Teaching Committee.

- If none of these routes seems satisfactory, please feel free to contact the Part IA Course Coordinator, Ed Tipper (Room S413, 33451, ett20@cam.ac.uk), the Teaching Support Manager, Helen Averill (Room N14, 68330, hpd20@cam.ac.uk) or the Director of Teaching, Nick Butterfield (Room E320, 33379, njb1005@cam.ac.uk).

Complaint procedures

If you are unhappy with the experience you have received from the department, faculty, service or staff member, the University has a Student Complaint Procedure for you to use in
order to try and resolve the situation. All information regarding the Student Complaint Procedure can be found on the website at: www.studentcomplaints.admin.cam.ac.uk/student-complaints.

At a local level if any issues arise which need action details should be passed on to the Teaching Support Manager or discussed with your Director of Studies in the department.

Examination review procedure

The University has robust policies in place to ensure that all examination results are accurate. However, something unusual may have taken place in the examination and you may want to check that the examiners were aware of the circumstances and that they have been taken into account. If you have any concerns about examination results you can request a review using the Examination Review Procedure, details of which can be found on the website: www.studentcomplaints.admin.cam.ac.uk/examination-reviews
12. Earth Sciences and Disability

The Department of Earth Sciences feel it essential that our courses throughout the three or four years of the NST, should be accessible to all students as far as possible. If you have any disability that might have an adverse effect on your ability to follow the Earth Sciences course or take the examinations, then it would help us to know at an early stage in the year.

The most direct route is through your College Director of Studies or Supervisor in Earth Sciences, probably in consultation with your Tutor. They will discuss with the course organisers the appropriate ways in which you can be helped to get the most out of the teaching. For instance, if you are colour-blind, you may need help with strategies for identifying rocks and minerals or in interpreting geological maps. If you are dyslexic you may need more time to complete practical exercises, and would qualify for this in the exams.

The department has helped a number of students with a range of more serious disabilities to succeed in Earth Sciences. You should not assume that Earth Sciences courses in second and later years would be inappropriate for you because you might have difficulty with one of their components, such as field work.
13. Careers following a Degree in Earth Sciences

There are a wide range of careers open to Earth Scientists, and a shortage of well-qualified applicants. As a Cambridge graduate you would be highly sought after, because you have a better basic science and maths training than geologists from most universities, and because the Cambridge Earth Sciences Department is known to be one of the best in the world.

There is a misconception that almost all careers in Earth Sciences are in the petroleum industry. In fact, less than half of geologists work in this field. The full range of job areas is as follows:

- **Petroleum exploration & production**: finding new oil & gas fields and CO₂ storage sites.
- **Energy and mineral extraction**: exploring for coal, metallic and industrial minerals.
- **Hydrogeology**: finding and maintaining subsurface water supply.
- **Geotechnics**: detailing rock & soil strength for engineering projects.
- **Environmental geology & geochemistry**: natural and industrial risk assessment, nuclear waste disposal.
- **School teaching**: teaching science in schools.
- **University research & teaching**: degree-level teaching and research.
- **Museums and libraries**: managing collections of geological material.
- **Publishing**: commissioning and editing geological books and journals.
- **Science in society**: science research and policy in public sector institutes.
- **Finance and consulting**: assessing natural resource investment for banks etc.

Earth Scientists are very well qualified for careers outside geology. Earth Sciences graduates have particularly good problem-solving abilities and a wide range of transferable skills. These qualities are valued by most employers. Earth Scientists are therefore highly competitive in the job market, even where specific geological skills are not required.

Salaries for Earth Scientists vary widely between professions. The salaries for UK jobs advertised for ‘geologist’ average £45,000. The petroleum and mining industries pay higher-than-average salaries, with US pay being the benchmark: starting salaries of £60,000 and pay after 10 years of £90,000. Salaries in the finance sector are even higher than in the petroleum sector.

The Sedgwick Club hold career-oriented talks to which you will be very welcome. There will be a careers evening on **Tuesday 20 November, 5.00-7.00pm** in the common room, with the first half hour for first years only. Please come along.
14. Transferable skills in the Earth Sciences

Transferable skills are generic skills that can be applied across academic subject boundaries and beyond. Transferable skills contrast with subject-specific skills, although the boundary is naturally blurred.

In the Earth Sciences Department we think that many transferable skills are best taught, learned, practiced and assessed if they are embedded in subject-specific courses. We monitor the opportunities that our courses provide to acquire transferable skills (Table 1) and ensure that our graduating students are well prepared for further study or work, whether in or beyond Earth Sciences. There are, however, some specific skills courses, listed in Table 2.

Table 1. Overview of the transferable skills acquired in Earth Sciences

<table>
<thead>
<tr>
<th>transferable skills</th>
<th>some relevant course components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual: criticism, analysis, synthesis, problem-solving, evaluation.</td>
<td>lectures, practical classes, small-group supervisions, seminars, field courses</td>
</tr>
<tr>
<td>Communication: speaking, listening, reading, writing, presenting (oral/written/graphic), giving and receiving feedback.</td>
<td>supervision written work and discussion, project work and evening presentations on field trips, 3rd year field mapping project, 4th year research project</td>
</tr>
<tr>
<td>Organizational: self-assessment, working independently, responsibility, initiative, time-management, career awareness.</td>
<td>weekly supervision work, field work exercises, 3rd year field mapping project, 4th year research project, external speaker lectures</td>
</tr>
<tr>
<td>Interpersonal: teamwork, leadership, negotiating, networking, managing people and resources.</td>
<td>teamworking on field course exercises and project work, involvement with student Geology society and outreach work</td>
</tr>
<tr>
<td>Research: collecting and recording data, processing, interpreting and presenting data, bibliographic skills.</td>
<td>practical classes, project work on field trips, 3rd year field mapping project, 4th year research project, literature review</td>
</tr>
<tr>
<td>Numeracy: mathematical, statistical and quantitative analysis, solving numerical problems, error analysis.</td>
<td>exercises in practical classes and small-group supervisions, project work</td>
</tr>
<tr>
<td>Computer literacy: word-processing, spreadsheets, graphics packages, geological software, Email, WWW, bibliographic searching, GIS</td>
<td>computer-based practical classes, 2nd year GIS course, 3rd year computer skills course, bibliographic skills sessions</td>
</tr>
<tr>
<td>Safety: navigation, assessing risk, urban first aid, wilderness first aid</td>
<td>field mapping exercises, 2nd year risk assessment seminar, 1st and 2nd year first aid course by external provider.</td>
</tr>
</tbody>
</table>
Table 2. Dedicated transferable skills courses in Earth Sciences

<table>
<thead>
<tr>
<th>transferable skills</th>
<th>hours</th>
<th>content</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA Field safety and first aid</td>
<td>3</td>
<td>basic field safety and first aid</td>
</tr>
<tr>
<td>IB Library skills</td>
<td>1</td>
<td>catalogues and literature searching</td>
</tr>
<tr>
<td>IB GIS</td>
<td>4</td>
<td>Geographic information systems, ARCGis</td>
</tr>
<tr>
<td>IB Risk assessment</td>
<td>1</td>
<td>field risk assessment</td>
</tr>
<tr>
<td>IB Field safety and first aid</td>
<td>3</td>
<td>wilderness safety and first aid</td>
</tr>
<tr>
<td>II Skills</td>
<td>11</td>
<td>report writing, presentation, drawing programs, reading primary literature, bibliographic skills</td>
</tr>
<tr>
<td>Part III exam skills</td>
<td>1</td>
<td>revision and exam skills</td>
</tr>
</tbody>
</table>
15. Department of Earth Sciences: Plagiarism Statement

(This is a shortened and more subject-specific version of the University statement at http://www.admin.cam.ac.uk/univ/plagiarism/students/statement.html)

Definition and scope

Plagiarism is defined as submitting as one's own work, irrespective of intent to deceive, that which derives in part or in its entirety from the work of others without due acknowledgement.

Plagiarism is the unacknowledged use of the work of others as if this were your own original work. It is always wrong and a breach of academic integrity, whether in supervision exercises, project reports, exam answers or published papers. The University regards plagiarism as a serious offence. The penalties for plagiarism may be severe and may lead to failure to obtain your degree. The University reserves the right to check any submitted work for plagiarism, and can do so with increasingly sophisticated software.

The golden rule is that there should be no doubt as to which parts of your work are your own original work and which are the rightful intellectual property of someone else.

Plagiarism may be due to copying (using another person's language or ideas as if they are your own) or collusion (where collaboration is concealed to gain unfair advantage).

Methods and media

Methods of plagiarism include:

- Quoting directly another person's language, data or illustrations without clear indication that the authorship is not your own and without due acknowledgement of the source.
- Paraphrasing the critical work of others without due acknowledgement. Changing words or their order does not avoid plagiarism, if you are using someone else's original ideas without acknowledgement.
- Using ideas taken from someone else without reference to the originator.
- Cutting and pasting from the Internet to make a pastiche of online sources.
- Colluding with another person, including another candidate (other than as explicitly permitted for joint project work).
- Submitting as your own work research that has been contributed by others to a joint project.
- Submitting work that has been done in whole or in part by someone else on your behalf (such as commissioning work from a professional agency);
- Submitting work that you have already submitted for a qualification at another institution or for a publication without declaring it and clearly indicating the extent of overlap.
- Deliberately reproducing someone else's work in a written examination.

Plagiarism can occur with respect to all types of sources and in all media:

- not just text, but also figures, photographs, computer code etc,
- not just material published in books and journals, but also downloaded from websites or drawn from other media,
- not just published material but also unpublished works, including lecture handouts and the work of other students.
Avoiding plagiarism

The conventions for avoiding plagiarism in the Earth Sciences are as follows:

- When presenting the views and work of others, cite the source in ways such as ‘…as shown by Jones (1938).’
- If quoting a secondary source, to which you have not gained access, make this clear in ways such as ‘…Hailstone (1802) as discussed by Marr (1916, p. 176).’
- If quoting text verbatim, use quotation marks or indented text and a citation; e.g. “Many of the great movements above described, appear to have been produced by an action both violent and of short duration.” (Sedgwick 1836).
- If using an exact or redrawn copy of a figure from another work, cite the work in the figure caption; e.g. ‘redrawn from Hughes (1866).’
- If incorporating data into a figure from another source, cite the source in the figure caption; e.g. ‘orientation data taken from Whittington (1938).’
- Collaboration with staff or other students during project research may arise during, for instance, Part II or Part III projects. If there is likely to be any doubt as to who contributed which parts of submitted work, make this clear in the text wherever necessary; e.g. ‘Prof. I.N. McCave supplied the comparative data on contourites in table 3.’
- Wherever a source is cited, the full bibliographic reference – including title, journal, volume and page numbers – must be given at the end of the report or essay, except in an essay done in exam conditions. Candidates are not required to make full citations in written examinations but should reference where appropriate.

Checking for Plagiarism

The University subscribes to Turnitin UK software which provides an electronic means of checking work for originality and is widely used in UK universities. Visit the Departmental website to find the document explaining how Turnitin UK will be used by the Department of Earth Sciences and which explains the implications of submitting your work to the software. Written work will only be checked if a candidate is suspected of plagiarism.

Any graduate student submitting written work suspected of plagiarism may also have their material checked using Turnitin.