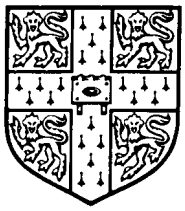
Department of Earth Sciences
University of Cambridge



PART IB EARTH SCIENCES B
COURSE GUIDE 2019-20

Contents

1. Introduction to the Course

Earth Sciences 'B' will introduce you to the physical and chemical principles that 'solid Earth' mineralogists, petrologists, geophysicists and geochemists use to understand how the Earth works, formed and differentiated; and how it has subsequently evolved. This is a self- contained course and you will find that, as the year goes on, there are important links between the different elements that are taught in each term. Earth Sciences B will provide you with some of the background that you will need for Part II & III Earth Sciences, and in particular for any advanced courses in metamorphic and igneous petrology; volcanology; mineralogy, geophysics and tectonics.

The skills that you will develop through the year will not only be intellectual (for example, in understanding theoretical elements of the course); but also practical (in particular, the ability to recognise and identify minerals in thin section and hand specimen; to interpret rock textures and model datasets). You will also be exposed to case studies of a number of important geological regions (including the Himalayas and the British Tertiary Volcanic Province). These examples will help you develop the essential geological skills of weighing up different sets of observations; comparing them with simple models and thereby developing an understanding of how these regions have evolved through time, and the processes that have controlled this evolution.

Dr Marie Edmonds (Course Coordinator)
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2. How to Get the Most out of the Course

Lectures remain the main formal way that we cover the essential parts of the course. You will find that you will need to follow up the material covered in the lectures (either by reading, or in the practicals, or more usually both) in order fully to understand the material. During the Michaelmas and Lent terms, weekly question sheets are circulated; the answers are usually available a week later. These question sheets may be used by your supervisors and they will usually contain a variety of questions designed to encourage you to think and to practise your newly learned skills.

Practicals play a very important role in the course. Here you will develop your petrological skills (with and without a microscope); learn how to tackle real geological maps, and so on. A key element of the practical teaching is the interaction with the *Demonstrators*. They are not there to intimidate you; nor to give you the answers on a plate – but instead to give you guidance on the problems in hand. You will miss out on a lot if all you ever do in practicals is to copy up the 'model answers' (which are usually made available at the end of each practical session). Please note that, unlike some of the practicals in Earth Sciences A, we do not plan to make multiple copies of the 'answers' available at the end of any practicals but for most parts of the course these will be available on Moodle.

Field trips at Easter, and in the early summer, will be very important in augmenting the material covered in the courses; in developing the field skills (including observation, measurement, note-taking and mapping) that you will need for your independent field projects later next year; and last but not least, they are a very useful way of getting to know the other people on the course!

Supervisions should be arranged for you by your college's Director of Studies, and will provide the usual mixture of more-or-less course-related essay/past-Tripos question/practical material.

Reading beyond the lectures will be essential if you are to develop a full understanding of the material that is being covered in the course. Copies of all your key texts are available on short loan from the Departmental and also your college library. The Department of Earth Sciences library is open for your use during normal working hours (9 am until 1 pm and 2 pm until 5 pm on weekdays), space permitting. In all instances, Part II and Part III undergraduates take precedence in terms of the use of the library and its collections.

Igneous and Metamorphic Rock Reference Series

There is an extensive reference series of rocks and minerals (both hand specimens and thin sections) in the 1B Earth Sciences B lab. This contains examples of many of the key rock types, and examples of textures and minerals that you are expected to become familiar with over the course of the year. This reference series is designed so that you should be able to work through the material on your own and in supervisions, and we recommend that you make use of this resource throughout the year (and not just in the last two days before the practical exams!). Details of the igneous rock reference series are available online at Moodle. The best petrologists really are those who have seen the most rocks – and there is no substitute for practical experience when it comes to having the skill and confidence to recognise rocks and minerals in thin section, and to interpret the significance of their assemblages and textures.

3. Lectures and Reading Lists

The Lecture lists for Part IB, plus timetables can be found on the Moodle. You can also set up your own personal timetable based on your subject and practical choices, using the online University Timetable.

Reading lists will be available on Moodle, and lecture notes and other course documentation will be added to Moodle throughout the year. Please speak to Helen Averill or Mitha Madhu if you are having any problems with access, although everyone should have access to the course pages from the beginning of Michaelmas Term.

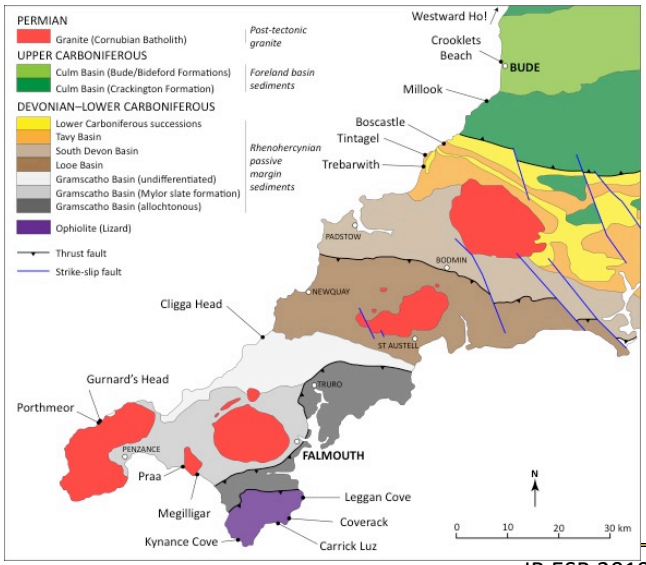
4. Field Courses

Southwest England: 17 to 27 March 2020.

The Cornwall field trip offers a superb opportunity to visit a beautiful part of the country and to see a variety of world-famous rocks. During the trip you will observe and interpret igneous and metamorphic rocks in the field, in order to understand petrogenetic processes and their close interplay with regional tectonics. The trip will provide a stimulating revision and application of key concepts that you have been taught during the ESB course, and provide you with excellent field examples for exam essay questions.

Students enjoying a day on the beach in Cornwall.

Cornish geology mainly comprises Devonian-Carboniferous sedimentary rocks (and minor volcanics) that were deposited onto the margin of the Rheic ocean, prior to being variably folded and thrusted during the Carboniferous Variscan Orogeny. At the southern tip of Cornwall, a mafic-ultramafic igneous complex (the Lizard) has been emplaced by thrusting from the south during the early Variscan, and is thought to represent an ophiolite. A major post-tectonic granitic batholith (the Cornubian Batholith) was emplaced at the start of the Permian and is associated with spectacular mineralisation. Collectively, therefore, Cornwall provides a perfect natural laboratory to understand igneous and metamorphic rock petrogenesis and an interesting and instructive time is had by all!



Simplified geological map of Cornwall.

There will be two parties. One party spends the first week in Dorset (Weymouth), then moves to Cornwall (Bude then Falmouth) on Sunday 22 March. The other party does the reverse (Falmouth then Bude then Weymouth). We strongly advise students taking a second year Earth sciences course to attend the whole field trip but a decision to attend in part must be made beforehand. However, 'A-only' students should at least come to Dorset and Bude and 'B-only' students at least to Bude and Falmouth. If you opt to do the whole trip and then drop out part way through, you will be liable for additional costs in the order of £250 towards accommodation and transport.

The first circular for the trip is usually sent in late January with payment required in early February. The course fee will be £100 as required by the University. Those wishing to attend Bude and Falmouth only will pay £60. Those wishing to attend Weymouth and Bude only will pay £75.

Isle of Skye: Friday 19 June 2020, for those who did not go on the IA mapping course, or Monday 22 June 2020, for those who did. The course ends on Saturday 4 July 2020.

Sign up for the Skye field trip is usually circulated in late April. The cost of the course is £110. The department contribute £70 towards food and you are able to claim up to £140 travel expenses.

5. Examinations

- There are two theory papers, each of three hours duration, which count towards 60% of the exam. Each paper is divided into two sections of five questions. You have to do two questions from each section.

- Note that past papers prior to 2015 are called *Geological* Sciences A and that the content of these sections was different in past papers from 2007 and earlier.

- There are two practical papers. Paper 1 (3 hours) may include questions on mineral structures, igneous and metamorphic petrology. Paper 2 (1½ hours) and usually comprises a series of map interpretation questions followed by a related petrological exercise. All practical questions are compulsory. The practical exam counts for about 40% of the total marks.

- The exam marking is done by a panel of three examiners, not necessarily staff who have taught the course in that year. Given the 60/40 ratio of theory to practical marks, each theory paper is scored out of 30% of the total marks, practical paper 1 is scored out of 26.7% and practical paper 2 out of 13.3%. 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 60% of candidates get a mark of 60 or above. The minimum marks for a pass, third, 2.2, 2.1 and first are 40, 50, 60 and 70 respectively. In a small subject cohort like IB Earth Sciences, there is some flexibility in these percentages and therefore in where examiners choose class borderlines. The examiners carefully scrutinise the marks of candidates close to borderlines, to ensure that you are awarded the subject class deserved by your exam performance.

- You are then given a *subject rank percentile* (SRP) according to your ranking in IB Earth Sciences A. If r is your ranking (1 = top) and c is the class size, then your SRP is $100\times(c+1-r)/c$. So, if the class size is 50, then the person ranked top gets an SRP of 100, the second person 98, and so on down to the bottom person who gets 2. The SRP is used below in assigning your overall NST class.

- The first estimate of your overall NST class is the median of your three subject classes. There is a table of all possible outcomes on the NST Course Website. A second measure is the arithmetic mean of your SRPs; candidates with an average percentile rank of ≥ 80% will be given a first, those between 80% and 40% a 2.1 and those between 40% and 20% a 2.2. Where the two methods produce different outcomes, you are placed in the higher of the two resulting classes.

- Your College Director of Studies receives a breakdown of your marks into a theory and practical score for each subject.

6. Marking Criteria for answers in Earth Sciences written papers

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

7. 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 570 (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
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.

8. Part II Project and Course Options

- Those of you who go on to take Part II Earth Sciences have to do a mapping project next summer. You will need to begin thinking about this project in the Michaelmas Term and have made a decision on your area by the middle of the Lent Term.

- There will be an **information evening/social for Part 1B students**, hosted by the Sedgwick Club and current Part II students. This is an opportunity to hear about the mapping project and the course at Part II, **Tuesday 8 October, 5pm in the Common Room**.

- An information booklet on planning the project will be issued early in the Michaelmas Term.

- A number of University funds have closing dates early in the Lent Term. If you want to apply for funds, you must have chosen an area by then.

- You will be assigned a supervisor in the second half of the Lent Term based on your area, although there is a list of experts in certain areas in the guide book and it is advisable to have talked to people about the suitability of your ideas early on in the planning process.

- Safety Induction. **Planning your mapping project safety 1.00-2.00pm, Thursday 20 Feb 2020** for any IB's thinking of continuing to Part II.

- A **First Aid Training session for Part II Mapping Projects** will take place on **12 June 2020**. Further information will be distributed nearer the time.

- Another option for Part II is to progress via the Physical Sciences route. By reading **Part II Physical Sciences**, you can continue to develop a broader knowledge of the sciences than a Part II single subject may provide. You can continue to study Earth Sciences via this route, and are not required to do a mapping project for this course. Instead you are required to submit a 5,000-word dissertation which is submitted in April 2020. Further information can be found on the NST Physical Sciences website.

9. Libraries

Your College library should have all the standard textbooks from your reading lists. If not, ask them to order them. You may need the support of your Director of Studies or supervisor.

The Department of Earth Sciences library is also open for your use during normal working hours, space permitting. **There will be three introductory sessions to the library facilities held at lunchtime in the library on 22, 23 and 24 October between 1.00 and 2.00pm**. You will need to sign up for these sessions in the library early in the Michaelmas Term. Then we hope that you will feel welcome in the Library and will start to make use of the extensive resources there.

- Make yourself known to the Librarian (Sarah Humbert) when you start to use the library. She will guide you to what you need.

- You will need your University Card to borrow from the library.

- The Departmental Library provides copies of all your key texts available on short loan. You will find them in the Library Office. Once you have registered with the Library staff we are more than happy for you to borrow up to five books at any one time from the Library. Be warned that fines for late return of short loans are high: £1 per hour late.

- The library also has a large geological map collection, which you will need when you come to plan your independent project.

- The Library has a suite of computers that are available for your use once registration for a department computer account has been completed. **Registration for your department computer account is online, and details will be circulated at the beginning of Michaelmas term.**

- There are three 'visitor' terminals which are intended primarily for searching the online catalogue. If you wish to book the Library laptop for group use (only in the Library) please contact the Librarian in the first instance at libraryhelp@esc.cam.ac.uk.

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 *s*tudents' 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 Earth Sciences A Course Coordinator, Alex Piotrowski (Room S411, 33473, amp58@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 Student Complaints web page**.**

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 Examination reviews web page.

12. Earth Sciences and Disability

Having done IA Earth Sciences, you will know that we aim to make our courses accessible to all students as far as possible. You should have received help or advice about any disability that might have a substantial and long-term adverse effect on your ability to follow the course or take the examinations; for instance, dyslexia or colour blindness.

If there is any new information about any relevant disability that we should know, please inform your Tutor, your College Director of Studies or Supervisor in Earth Sciences and the Teaching Support Manager, Helen Averill (hpd20@cam.ac.uk) soon as possible. They will discuss with the course organisers the appropriate ways in which you can be helped to get the most out of this year's teaching.

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:

- *Environmental geology & geochemistry*: natural and industrial risk assessment, nuclear waste disposal.
- *Petroleum exploration & production*: finding new oil & gas fields and CO_2 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.
- *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 from 5.30pm.

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*

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

Table 2. *Dedicated transferable skills courses in Earth Sciences*

transferable skills	**hours**	**content**
IA Field safety and first aid	3	basic field safety and first aid
IB Library skills	1	catalogues and literature searching
IB GIS	4	Geographic information systems, ARCGis
IB Risk assessment	1	field risk assessment
IB Field safety and first aid	3	wilderness safety and first aid
II Skills	11	report writing, presentation, drawing programs, reading primary literature, bibliographic skills
Part III exam skills	1	revision and exam skills

15. Department of Earth Sciences: Plagiarism Statement

(This is a shortened and more subject-specific version of the University statement, the full version of which can be found on the University website).

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.