

Department of Earth Sciences
University of Cambridge



PART III EARTH SCIENCES COURSE GUIDE 2021-22

Contents

1.	<u>Introduction to the Course</u>	2
2.	<u>Course Format and General Information</u>	4
3.	<u>Part III Options and Course Documentation</u>	7
4.	<u>Part III Project and Managing Research Time</u>	8
5.	<u>Reading a Scientific Paper</u>	9
6.	<u>Examinations</u>	10
7.	<u>Marking Criteria</u>	12
8.	<u>Laboratory Safety and Conduct</u>	13
9.	<u>Department Computing Facilities and Training</u>	14
10.	<u>Feedback Processes</u>	16
11.	<u>Earth Sciences and Disability</u>	18
12.	<u>Plagiarism Statement</u>	19

1. Introduction to the course

Welcome to Part III Earth Sciences which is an MSc-level course. Having built up the basics over the past three years, the focus now shifts to the application of those principles, and a more critical, interrogative and creative approach to understanding how the planet works. Increasingly, the important insights in Earth Sciences turn up in the territory between the conventional disciplines, and the course is designed to encourage a breadth of research-level experience, even as you focus on your own research project. By the end of the course you will be in a position to take on advanced academic research – or any other occupation requiring analytical ability, intellectual dexterity, writing skills, presentation skills and self-motivation.

There are three principal components to Part III Earth Sciences:

1) The research project. This is the centrepiece of the course, where you address a particular research question over the course of the Michaelmas and Lent Terms. You will submit a report demonstrating your ability to generate new observations, data and ideas. Importantly, the success (and grading) of these projects is not measured in absolute results, but the approaches you take in pursuing them. Your project supervisor will be there for general guidance, but it is up to you to drive the work forward, and in the direction you think it should go. The key is to do lots of reading, attend lots of seminars, and interact with the many other researchers. The key to great research is often to formulate the right questions.

2) Option courses. Specialist option courses offered during the Michaelmas and Lent terms are a further step up from Part II lectures, with an increasing focus on current research issues and debates. As such, the topics and content will vary from year to year, as will the structure of any particular course. At least 14 (usually more) four-week option courses are offered each year, from which you will officially take six. Easter Term exams will be individually tailored to a particular option, but they all will be looking for an advanced near-research level of understanding. This means not only being able recall factually accurate material, but also being able to synthesise material from your lectures, reading and seminars. The best means of achieving this level of understanding, and the ability to communicate it, is to engage fully with the suggested reading for your course options, to always ask questions to your lecturers and supervisors when needed (there is no such thing as a silly question, apart from the question never asked). It is also essential to arrange regular supervisions to allow you to practice writing essays, obtain essay feedback, and clarify your understanding.

3) Seminars and the Easter field trip. The Department hosts a broad range of seminars and seminar series, and you should make it your business to attend as many as possible. This is the best way of tracking the very latest research in your areas of interest, and seeing how it gets done (and presented). The Departmental Seminars and Bullard Seminars (all available online in 2021-22) are particularly recommended. A short seminar series at the beginning of Easter Term will address issues and research broadly inspired by the Easter field trip. The field trip to South East Spain – is in some sense a revision of the MAST course – and one of

its highlights usually takes place in the Easter vacation. Due to Covid-19 the field trip may not go ahead. Details will be circulated nearer the time.

Covid-19. This year, every aspect of teaching and participation in departmental activities will be constrained by newly devised protocols designed to keep us all safe. We hope to provide as rich and fulfilling a range of lectures, practicals and project work as we possibly can. The intention is to have most lectures and practicals in socially distanced face-to-face sessions in the department. Project work will be undertaken in conformity with protocols devised for each of the research groups that you will be joining. It is inevitable that changing circumstances, such as an outbreak among students or staff and revised guidelines from the government/university, will result in changes to details of the safety protocols. The fallback position for anyone who is unable to attend in person or if there is further lockdown will be that, as far as possible, lectures and practicals will be available online. Any adjustments to the conduct of the Easter Term exams will be provided in advance, whatever the style of delivery of teaching that has been possible.

Luke Skinner and Sanne Cottaar (Part III course-coordinators)
lcs32@esc.cam.ac.uk or sc845@cam.ac.uk

2. Course Format and General Information

Michaelmas Term:

Option courses	Up to six @ 12-16 hours (two 1.5- or 2-hour sessions p/w x 4 weeks)
Project	12 hours per week
Seminars	two seminars per week

Optional attendance of Part II Core courses

Lent Term:

Option courses	Up to six @ 12-16 hours (two 1.5- or 2-hour sessions p/w x 4 weeks)
Project	12 hours per week
Seminars	two seminars per week
Poster	3–4 preparation days, dates to be confirmed
Field Trip	To be confirmed

Optional attendance of Part II Core courses

Easter Term:

Part III seminars	five-six invited seminars, early May
Student project talks	Dates to be confirmed
Student-organised supervisions and revision.	

Options courses

Students take **six Option Courses** from a relatively broad offering of topics (published at the beginning of the academic year). Three of these options are ‘interdisciplinary courses’ that stretch between University departments (Chemistry, Earth Sciences, and Physics). IDP2 is taught in Earth Sciences and rooted in Earth System science, but is open to Chemistry and Physics students. Please consult your Director of Studies before deciding on the two IDP courses that are taught outside the Department (IDP1 and IDP3) as they require a certain degree of background knowledge. **Note: You are welcome to attend any lectures that you might find useful.**

Research Project

You are advised to spend around 12 hours per week on your research project in the Michaelmas and Lent Terms. If you are doing a lab-based project, you will need to fill in a hazard assessment form. Please contact the relevant lab supervisor.

If necessary, the Department can prepare up to ten thin sections of key rocks associated with your project. Samples should be handed in to Reception along with a completed thin-section form providing specific requirements. Please draw a line round the rock in felt tip pen to indicate how you wish the rock to be cut.

The research report must not exceed 7500 words, and must be accompanied by relevant notebooks and the original research proposal (bound in as an appendix). An electronic copy of the report and scanned notebooks must also be submitted to Helen Averill.

The Report must be submitted by 4pm Friday 11 March 2022. Be aware of the penalties for missing this deadline: five per cent of the maximum mark available for the report will be subtracted for each day, or part of a day, that submission is delayed. Only under exceptional circumstances, and with advance notification, will any exceptions be considered.

Teaching methods

The plan for 2021-22 is for face-to-face teaching as much as possible. However, some aspects of the course may have online resources available, where directed by the lecturers, and where judged to be of sufficient quality and usefulness to be suitable for teaching this year.

Supervision for option courses

Some lecturers will arrange small group tutorials or 'supervisions' for their courses, but students are encouraged to take advantage of the supervision system more generally, and to arrange supervisions for themselves as needed. Feel free to approach lecturers for additional sessions or the names of alternative supervisors. You should aim to have at least two supervisions per option course. Supervisions are a good setting to ask for potential essay titles, and ask for feedback on your essays.

Weekly Seminars

Attending seminars is a key component of the course, an opportunity to take in the latest research in Earth Sciences, and to think critically about it. The Department Seminar Series and the Bullard Seminar Series will be available online, with the relevant links circulated weekly by email. There are also PhD student seminars on Friday afternoons.

All seminar details are published on the [Department of Earth Sciences seminar page](#).

Posters

All MAST and Part III students are asked to prepare and present a poster on their research project. These would usually be presented in an open poster session in the Department Common Room, but due to the pandemic have more recently been presented online. A decision has not yet been made regarding the form this year, however details will be provided nearer the time, and the date for the session is **Wednesday 26 January 2022**. This is a great opportunity to get feedback on your project work at the halfway point, and to gain experience in science communication. The poster itself is not examined and does not contribute to your final mark.

Project presentations

All MAST and Part III students are required to prepare and present a short presentation on their research project, including a 10-minute talk and 5 minutes for follow-up questions. These are scheduled for Easter Term (further details to be arranged nearer the time). All Part III and MAST students are expected to attend all of the sessions, and there is an open

invitation to other members of the Department. Like the poster presentation, this oral presentation is not assessed.

Field Trip

The field trip to Spain usually runs in late March/early April. The cost to students is a nominal £135. If the trip goes ahead in 2022 an online registration form will be circulated in December. You will be kept informed of any changes or updates as they arise.

Part III Easter Seminars

A series of research seminars will be presented specifically for MAST and Part III students in the first two weeks of Easter Term. These have typically followed up on aspects of the Spain field trip, but might be somewhat less thematic this year.

3. Part III Options and Course Documentation

The full Options list for Part III Earth Sciences, plus timetables can be found on Part III Course on [Moodle](#). You can also set up your own personal timetable based on your option 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.

Part III Options 2021-22

1. Jackson/Copley - Continental tectonics and mountains
2. White - Probing lithospheric dynamics through space and time
6. Gibson - Solid Earth volatile cycles
7. Edmonds/Woods - Volcanology: physical mechanisms and petrological processes
13. Harrison - Magnetism of Earth and planetary materials
14. Ringe - Electron microscopy (M8) (tbc)
15. Farnan - Nuclear materials (M17)
16. Field - Amniote palaeobiology
17. Edmonds/Jackson - Natural hazards
18. Wolff/Bauska - Frontiers of ice core science
19. Copley/Davies/Weller - Earth history
21. Rawlinson/Neufeld/Al-Attar - Computational Geosciences
22. Butterfield - Palaeobotany
23. Branson/Turchyn - Topics in environmental Geochemistry
24. Cottaar - Journey to the centre of the Earth
- IDP1 - Pyle/Schmidt - Atmospheric chemistry & global change
- IDP2 – Skinner/Wolff/Turchyn - The Earth system and climate change
- IDP3 - Deschler/Dutton/Rao - Renewable energy: concepts, materials & device physics

4. Part III Project and Managing Research Time

The Part III project is an opportunity for you to develop your own ways of planning and executing a research project. Whilst individual styles of research vary, there are some common features:

1. Most research projects have a number of components in common, for instance *data gathering, data analysis, learning of techniques, coding, library work, writing, drafting diagrams, and general 'housekeeping'*.
2. These components do not need to be done in sequence, and can be overlapped to make the best use of time. Avoid falling into the trap of leaving your report writing until the very end. It's not until you try explaining your results to others that the gaps in your data and analytical reasoning will appear.
3. Different research tasks require different levels of concentration, allowing less demanding tasks to be done when you might otherwise feel too tired to make progress. Drafting diagrams, for example, typically requires less concentration than writing text.
4. Do not expect your research, however well planned, to proceed in a straight line towards your final report. Most successful projects involve a good number of blind alleys, backtracks, and technical hitches. Learn from these rather than get frustrated by them. It's also worth appreciating that your project will be assessed on how you went about investigating the relevant issues, rather than successful results *per se*.
5. It is important to keep a lab notebook. Each day, note down activities done, problems solved, intermediate results, highlights of papers read, questions you have, or points of discussion for meetings with your supervisor. A lab notebook allows you to monitor the progress and evolution of your project.

5. Reading a Scientific Paper

Why read this paper?

How you tackle a paper depends largely on your reasons for reading it. Some possible reasons are:

- as background reading for a mapping or research project.
- for abstracting specific data or results for a project.
- as part of a series of related papers to distil into a report or essay.
- for further reading around lectures.

Reading strategies

Adopt a strategy consistent with your reasons for reading the paper. The strategies are ranked in order of speed, and you can start with a rapid strategy and move down the list to a more time-consuming one if the paper warrants it.

- read the abstract only
- *skimming*: as above plus a glance at the figures and any concluding summary.
- *scanning*: as above plus reading the first lines of each section or paragraph, together with appropriate figure captions.
- *reading*: essentially word-by-word, and with a 'critical' eye (with careful attention to methods, assumptions and any questions raised).

Summarizing strategies

Choose a strategy for summarizing the essentials of the paper, which is appropriate to your purpose:

- summary notes on a record card or database.
- highlighting or underlining on a photocopy of the paper.
- diagrammatic notes.
- full notes, or a short paragraph (e.g. attached to a printout of the paper) noting the main findings, their premises (assumptions/methods etc.), and any difficulties or questions that occur to you in reading the paper (the latter might form the basis for a discussion in supervision, or with your lecturers).

Moving on

- The reference list provides a guide to relevant published papers. You may wish to track down and read any that seem of interest/importance.
- A citation index (e.g. Web of Knowledge, Scopus) lists later papers that cite the one you've read.

6. Examinations

General points

Each candidate must enter a Research Project, the Seminar Paper and six Option Papers. All examination questions and projects will be marked by a separate Part III Board of Examiners. Each student will have a viva with an External Examiner, focussed primarily on the research project, but potentially other aspects of the course. The viva is not assessed, but may be used by the Examiners to resolve class boundaries.

Seminar Paper

The 'Seminar Paper' has two sections, with students answering one question from each. Section A will consist of a wide range of questions, using the year's Department and Bullard seminars as thematic guides. Questions for section B will draw broadly on aspects of the Easter field trip and the associated Easter Term seminars. Students are advised to read around a substantial range of seminar topics. Note: the format of this may differ this year depending on whether the field trip goes ahead. The Seminar Paper will be delivered online.

Option Papers

The majority of options will have a 2-hour examination during the main exam period. The exact format of these exams will be made known at the start of the year in the Part III/MASt Options document. Exam formats may include written answers, calculations or the description and discussion of specimens, thin-sections, etc.

Some courses will also run assessed practicals or formal practical examinations related to their course. The division of marks between theory and practical will be made known at the start of the year. The format of the assessed practicals may be a timed exercise at the end of the Lent or beginning of the Easter term, or assessed exercises taken during the course. They may involve specimen description and discussion, calculation, map exercises, writing short reports, or computer based exercises but the exact format of these assessments will be made known at the start of each course.

Viva

The Viva takes place during the last week of Easter term. It is a formal requirement for Part II and Part III and MASt, however it is not assessed and is relatively informal. As much as anything, the viva is an opportunity for you to talk about your project with someone who has read through it in detail, and to discuss any questions and concerns that may have arisen along the way. Most students find the viva very enjoyable.

Project report

The report of a research project shall be on a subject which may be either proposed by the candidate and approved by the Head of the Department of Earth Sciences, or chosen by the candidate from a list of approved subjects announced by the Department by the beginning of the Lent Term in the academic year immediately preceding the examination. Each candidate shall either obtain the approval of the Head of the Department for the subject proposed or notify the Head of the Department of the subject chosen from the list not later than the division of the Lent Term immediately preceding the examination.

Records of class and fieldwork

The records of classwork and fieldwork shall be submitted to the Examiners through the Teaching Support Manager (Helen Averill) not later than the last day of the written examinations and shall bear the signatures of the teachers under whose direction the work was performed.

EXAM STRUCTURE

Exam component	Duration (hours)	Marks	Number of exams	Total marks	Notes
Seminar paper	5	6%	1	6%	Two answers; one from each section. <u>Section A</u> : Topics covering a wide range of issues in the Earth Sciences. <u>Section B</u> : Topics based broadly on the Easter field trip and seminars. Online open book with word limit.
Option papers	2	9% each	6	54%	Six papers from a choice of 15, one for each option course. Some courses have associated assessed practicals. In-person, closed book.
Research project report	-	40%	1	40%	Maximum 7,500 words, plus lab notebook(s)
Viva	0.5		1		No formal mark. Used primarily to assess student engagement.
TOTAL				100%	

7. Marking Criteria for Answers in Earth Sciences Written Papers

The table below outlines the marking criteria in Earth Science for written exam papers. A few key criteria have been highlighted to help you understand what is required for certain class marks. For example, it is imperative that you **read the exam question carefully, and make sure you answer the question posed** – failure to provide a relevant answer will likely result in a 3rd class or failure. It is also worth noting that the avoidance of factual errors is a requirement for 2.2. or 2.1 level grades, while 1st class grades typically further require evidence of reading beyond the lecture material. This may provide further motivation to read ‘around’ your lectures, and to discuss relevant papers in lectures and supervisions.

%	Class	Criteria
90-100	1	Brilliant answer. Exceptional understanding of subject and relevant literature. Outstanding critical analysis , full of insight Excellent 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.
<i>Expectations of appropriate ‘critical analysis’ and ‘relevant literature’ will vary from year to year of the Tripos</i>		

8. Laboratory Safety and Conduct

Covid-related safety

Particular rules have been set for individual teaching rooms to limit the transmission of Covid-19 in the Department. See the 'Standard Operating Procedures' and day-to-day updates on the relevant Moodle pages. More generally:

- Face masks must be worn at all times while you are in Department buildings.
- Each lecture and laboratory room has a maximum safe capacity that must not be exceeded.
- 1m social distancing must be observed at all times. Students must not approach the lecturer, demonstrator or one another.
- Hand sanitisation must take place on entry and exit to the labs, and between handling samples or different pieces of equipment.

Please read the [Government guidance on safe practice related to Higher Education settings](#), the [NHS Covid-19 pages](#) and the [University's Covid-19 pages](#).

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.
- If the fire alarm sounds, you will hear a very loud continuously ringing bell. On the instruction of the demonstrator in charge. 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.
- Handle ALL specimens with care. Many, especially the palaeontological material, are of museum display quality and are irreplaceable.

9. Department Computing Facilities and Training

The Computing Code of Conduct covers the use of computing equipment by staff and other authorized persons in the Department of Earth Sciences. Please familiarize yourself with it.

Details of Department computing facilities usually available to students are listed below. Due to Covid-19, access to some of the hardware components will be restricted. Please check with the Computer Office for further information:

	Library	Galson Sciences Lab (N312)	Printer Room (S212)	Part 1B Lab (S213)	Part II Lab (S322)
HARDWARE					
Windows/Linux PCs	X	X			
Linux PCs, Macs		X			
Windows Only PCs				X	X
Colour Printer (up to A3)	X		X		
Colour Plotter (up to A0 poster size)		X			
Black and White Printer (up to A4)		X			
Scanner	X (Copier plus two scanner 9600×4800)	X (Scanner 9600×4800)	X (Copier)		
SOFTWARE					
MS Office	X	X		X	X
Arc GIS	X	X		X	X
Origin	X	X		X	X
Matlab	X	X		X	X
Mathematica	X	X		X	X
Igor	X	X		X	X
Inkscape(drawing), GIMP(image manipulation, Scribus(poster making)	X	X		X	X
Libre Office, Open Office	X	X		X	X
Standard Linux Applications (including GMT and R)	X	X			

Training in computer skills

At the beginning of your Part II year, you had a course on presentation and computer skills, including report writing, bibliographic skills, computer graphics, stereo-plotting, and map drawing. You will have further developed many of these skills in compiling the report on your Part II mapping project. With the Part III project giving a more specialised flavour to your fourth year, extra training in computer skills needs to be targeted to your individual needs.

For this purpose, the University Computer Service offers a portfolio of courses throughout the year. You are strongly advised to attend relevant courses, either to upgrade your own capabilities in a particular area, or to learn a new skill in an area appropriate to your project. Courses are free to students, but you must book in advance – most courses get booked up days ahead. You can register online via the [UIS Training web page](#), where a full timetable and description of courses is available. You must explicitly cancel your booking in advance if you cannot attend. Most courses assume some prior knowledge of basic computing skills, but no more than you should have from your Part II experience.

The topics likely to be of most interest to Part III students will be:

- Bibliographic software (EndNote)
- Databases
- Desktop Publishing
- Graphics and photo/image processing
- Multimedia
- Presentation software (PowerPoint)
- Programming
- Spreadsheets
- Statistical and mathematical software
- Unix (inc. Linux)
- Web page authoring

As well as these taught courses, there are Self-Teach Courses available for some popular applications. Full details of self-taught courses are listed on the [UIS Training web page](#).

10. Feedback Processes

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 III Course Coordinators, Sanne Cottaar (sc845@cam.ac.uk) or Luke Skinner (luke00@esc.cam.ac.uk), the Teaching Support Manager, Helen Averill (Room N14, 68330, hpd20@cam.ac.uk) or the Director of Teaching, Alex Copley (acc41@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](#).

11. Earth Sciences and Disability

Having studied 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 at 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.

12. 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.