

# 1 Introduction

## 1.1 The Purpose of this Programme Handbook

This handbook is a guide to what is expected of you on the MSc/Dip GeoScience and Remote Sensing, and the academic and pastoral support available to you. Please read it carefully. It will help you to make the most of your time on the programme. Some important general aspects covered in this handbook are amplified in the University's *Code of Practice for Taught Postgraduate Programmes* (<http://www.postgrad.ed.ac.uk/MASCODE/DEFAULT.HTM>), which will have been issued to you with your matriculation papers and which you are also expected to read. This handbook does not supersede the University *Regulations*, <http://www.drps.ed.ac.uk/07-08/>.

The programme handbook is supplemented by the programme web page: [http://www.geos.ed.ac.uk/abs/Postgraduate/MSc\\_GRS\\_Programme.html](http://www.geos.ed.ac.uk/abs/Postgraduate/MSc_GRS_Programme.html)

Please note that every effort has been made to ensure that the information contained in this handbook was correct at the time of going to press.

## 1.2 Key Contacts

<p><b>MSc Programme Director</b></p> <p>Dr Hugh Pumphrey</p> <p><a href="mailto:H.C.Pumphrey@ed.ac.uk">H.C.Pumphrey@ed.ac.uk</a> Phone: 0131 6506026 Room 313 Crew Building, KB</p>	<p>The Programme Director is responsible for directing student's studies, and for the academic content and quality assurance of the programme. He should be your first point of contact for academic queries and pastoral support.</p>
<p><b>MSc Programme Secretary</b></p> <p>Connie Fox</p> <p><a href="mailto:connie.fox@ed.ac.uk">connie.fox@ed.ac.uk</a> Phone: 0131 6504866 Room 211 Crew Building, KB</p>	<p>The Programme Secretary provides administrative support for students and academic staff involved in the MSc Programme. She can help you decide who to speak to about issues such as building access, printing, council tax, visas etc. If the programme director is not available she can provide pastoral support to students.</p>
<p><b>Course Organisers</b></p> <p>e.g. Dr Tim Malthus and Dr Chris Merchant</p>	<p>Course Organisers are responsible for the content and assessment of individual courses. They should be the first point of contact for any issues arising specifically related to their course.</p>
<p><b>Course Secretary</b></p> <p>e.g. Connie Fox or Caroline Keir</p>	<p>The Course Secretary will collect paper copies of assignments and process marks for each course. This will usually be the programme secretary; however this is not always the case. Your MSc programme secretary can point you in the right direction.</p>
<p><b>Dissertation supervisor</b></p>	<p>Your supervisor will provide academic guidance for your dissertation. This is covered in more detail in Section 7.</p>

### 1.3 Glossary

Usage varies in different institutions. Here is what various words mean in this context:

**Programme** The MSc (or Diploma) is a “programme of study”, or simply a “programme”.

**Course** The taught element of the programme is modular, and the study modules are referred to as “courses” (or sometimes as modules). For example, Radiative Transfer is a course.

**Compulsory** The courses that all students on a particular programme must take are “compulsory” courses.

**Options** Courses that are elective – i.e., you choose these to tailor the programme to your interests (within the constraints of timetabling, etc).

**Semester** There are two semesters. The semester before the Christmas/New-Year vacation is “semester 1”, and the one after is “semester 2”. Each is 11 weeks long + weeks of associated examinations.

**Block** A five-week period within a semester, either weeks 1 to 5 or 6 to 10 inclusive. Week 11 of semester 1 is free of taught classes to allow students to revise before exams. Blocks 1 and 2 are in semester 1; blocks 3 and 4 are in semester 2. Some courses last a full semester, others last for one block.

**Credits or Points** These measure the relative weight attached to various elements of the overall programme. To complete the taught element of the programme you must undertake and pass courses with associated credits totalling to at least 120 credits. The courses you are likely to take are all valued at 10 or 20 credits.

**Marks** You will receive a mark for each course you take. These are given from 0 – 100% and the full marking scheme is included in Appendix 1.. To pass at Masters level you should achieve an overall mark of 50% or above. To pass at Diploma level you should achieve 40% or above.

## 2 Overview of MSc Programmes

### 2.1 Introductory Week

This is the week before the start of Semester 1. A range of events and activities are organised to introduce students to the University, the School of GeoSciences, and the various facilities and services that are available to support their studies, and to give students the chance to get to know each other and their surroundings. It is also an opportunity for students to familiarise themselves with the MSc programme, and select their choice of optional lecture courses. The full programme of activities is described in Section 4.

### 2.2 Taught Component

Master of Science/Diploma programmes comprise 120 taught credits and 60 credits associated with project work (research) leading to a dissertation.

Courses are outlined in Section X. Optional courses will only run if a sufficient number of students register to attend them.

Coursework teaching is confined to the first two semesters of the academic year. The relevant dates are:

Semester 1	22 September 2008	ends	5 December 2008
Semester 2	12 January 2009	ends	27 March 2009

Examination period for the first semester will take place from 8 – 19 December 2008.

No teaching will occur during the Christmas Vacation (22 December 2008 - 9 January 2009) and the University will be closed from 22 December 2007 – 4 January 2009 inclusive.

Timetables and outlines of course contents are included in Section X. We reserve the right to withdraw options if there is insufficient demand to make them viable and to restrict option choice according to qualifications and experience. Because of timetabling constraints it is not possible for us to offer unrestricted option choice. We feel, however, that the current timetable allows all the most logical courses combinations to be taken.

### 2.3 The Diploma

Candidates may enter solely for the Diploma programme (nine months), subject to availability of space on the MSc degree programme and the consent of the Programme Director. A performance at Diploma level is a competent, good or distinctive performance at a postgraduate level, below that required for an MSc. Diplomas may be awarded in the following ways:

- (i) Diploma students take the MSc taught programme and must:
  - attain at least 80 credits with a pass at diploma level (40 %) or more in each of the separate elements and;
  - be awarded an aggregate pass at diploma level (40 %) for the 120 credits of study examined for the diploma and;
  - pass the core courses at diploma level (40 – 49 %, grade D) or higher.

A Diploma may be awarded "with Distinction" where a candidate has achieved a distinctive performance in the taught component of the programme.

- (ii) Candidates entering for the MSc programme who fail to achieve final and/or core course marks at the level required for progression to the MSc (50 % or above, grade C) may be awarded the Diploma, providing they meet the requirements set out in (i) above.
- (iii) Students who achieve the required level for progression to the MSc (Pass) but who subsequently submit a dissertation below the level required for an MSc (Pass) may be awarded the Diploma.

## 2.4 Progression to MSc dissertation

In order to progress to the masters dissertation candidates must:

- attain at least 80 credits with a pass at masters level (50 %) or more in each of the separate elements and;
- be awarded an aggregate pass at masters level for the 120 credits of study examined at the point of decision for progression and;
- achieve a mark of 40% or above in **all** of the compulsory courses **and** an average of 50% or above for compulsory courses.

An overall mark of 0-39% (E) will result in a Fail. A student achieving an overall final mark in the coursework of >69% will be eligible to be considered for the award of an MSc degree with Distinction, **provided** the dissertation is judged to be of outstanding quality.

## 2.5 Dissertation

The dissertation is a report of an independent research project, conducted by the student part-time throughout semester 2 and full-time thereafter, until the final submission date of 10 August 2009 (with a web page due by 21 August 2009). Each student is guided in their research by the programme director or two supervisors, with good knowledge of the field under study. The supervisors may be staff from the University of Edinburgh or professionals working in any appropriate external organisation.

The research topic is normally proposed by the student, in accordance with their own interests, or is proposed by University staff or external organisations: the Programme Director will ensure that students are informed of any such opportunities during November in semester 1.

A successfully completed dissertation provides clear evidence of a student's ability to conduct independent research in a particular field of study. As such, it is of great interest to potential employers. Students are therefore recommended to select a topic that is related to their future career plans, to maximise the benefits derived from the dissertation project.

All aspects of the dissertation stage of the programme are fully explained in Section 7.

## 2.6 Graduation

The Graduation Ceremony will take place in late November or early December 2009; Registry will publish the date on their web page when available (<http://www.registry.ed.ac.uk/graduations/default.htm>).

Students may graduate either in person or *in absentia*. You will receive a graduation registration form sometime in June and the completed form and graduation fee (currently £40) should be returned to Registry, Old College.

### 3 MSc/Dip Geoscience and Remote Sensing

#### 3.1 Programme Specification

This is a guide to the content of the MSc degree programme in GeoScience and Remote Sensing. The staff who teach this programme are committed to offering students enthusiastic and authoritative teaching, and look to students to engage with dedication in the learning process. So, the learning outcomes *etc* specified here are what a student who engages in this way can typically expect to achieve. Of course, every student's route through this programme and actual achievements will be unique.

##### 3.1.1 Educational aims of programme

GeoScience and remote sensing refers to the scientific study of Earth and its global environments using remotely sensed data from space-based sensors. This demanding discipline involves the methods and technologies of remote sensing that are applicable also

- to exploration of the wider universe, and
- to many medical, meteorological, military and industrial endeavours.

We aim to help students equip themselves with

- a thorough understanding of the physics, mathematics and technologies that are exploited in the application of remote sensing technology to the geosciences
- a wide general knowledge of the applications of remote sensing to the study of Earth from space
- a mix of related skills (e.g., in programming, image processing, computer modelling) reflecting the students' priorities
- the ability to undertake significant research in any field of application of remote sensing

We also aim

- to develop students' transferable skills in IT, problem-solving, project management, scientific presentation and scientific writing
- to guide students through a challenging and stimulating research project on a significant environmental issue, in which their new knowledge and skills are used and extended (MSc only)

##### 3.1.2 Programme Learning Outcomes

The outcomes given are specifically what a student can learn from the core courses of the taught element of the programme, and the dissertation. Elective courses allow students to learn more in related areas: e.g., image processing, computer programming, informatics, radar remote sensing, hyperspectral remote sensing.

###### *Core knowledge*

Electromagnetic radiation and how it interacts with matter, particularly the land surface, the oceans and the atmosphere.

'Retrieval' theory – i.e., how to infer valid information from remote observations (e.g., of electromagnetic spectra).

Remote sensing technologies and their spatial and temporal sampling characteristics.

Computer modelling and data assimilation (the fusion of computer simulations and real observations to generate increased insight).

The application of remote observations to contemporary topics in geoscience.

*Intellectual skills*

Critical thinking in the interpretation of observations and imagery.  
Capacity to relate observations to models (mathematical, computational and conceptual) of reality.  
Ability to harness core knowledge to conceive, plan and execute significant research.

*Subject-specific skills*

Handling (reading, displaying, transforming, etc) digital data using scientific software &/or by programming.  
Skills in field data collection and analysis.

*Transferable skills*

Communication of science in formal writing and verbal/visual presentation.  
Project planning and time management.  
Numerate problem formulation and solving.  
Ability to locate, review, synthesize and evaluate published scientific literature.

**3.1.3 Programme structure and features**

See below for a diagram and details of how the programme progresses through the academic year.

The programme comprises 120 taught credits and 60 credits associated with project work (research) leading to a dissertation. Core courses amounting to 50 credits are normally compulsory, in addition to 20 credits taken from a short list of elective courses. Additional elective courses (from the Schools of GeoSciences and of Informatics) totalling to 50 credits must be taken over the two semesters.

It is normal for 50 to 70 of taught credits to be taken in Semester 1. Normally, a 10-credit course will involve between 15 and 20 hours of timetabled contact hours (lectures and tutorials) plus around 40 hours of directed/self-directed work and study.

The compulsory courses are:

Applied Image Processing  
Contemporary Issues in Earth Observation  
Fundamentals for Remote Sensing  
GIS in the Field  
Research and Project Management Skills

Recommended elective courses are:

Hyperspectral Remote Sensing  
Inverse Theory  
Principles of Geographical Information Science  
Radar Remote Sensing  
Radiative Transfer  
LIDAR  
Geoinformatics

Some other possible elective courses are listed in Section 5.4.

The project work involves undertaking useful research in any field involving the application of remotely sensed data, as agreed with the programme director and a supervisor from the Schools of GeoSciences. The research is to lead to a dissertation that principally comprises a draft article for a peer-reviewed journal, together with a non-specialist web-based summary.

The first step in the project work is the scoping of a detailed project proposal, which is done with the benefit of the training via the course RPMS. The project proposal, a research report in the form of a journal article, and the web-based summary material, together constitute the thesis on which the degree is assessed.

## 4 Introductory Week 2008

<b>Monday, 15 September</b> This is a University Holiday however it is possible to matriculate	
12.30 – 16.30	<b>Matriculation</b> Recommended Matriculation times for PG Study, Adam House, Chambers Street.
16.00 or 17.00	<b>TEAM tests * (for non native English speakers)</b> Institute of Applied language Studies, 21 Hill Place
<b>Tuesday, 16 September</b>	
10.00 – 11.00	<b>Welcome and Introduction to Remote Sensing programmes</b> Hugh Pumphrey, Rm 301 Crew Building, Kings Buildings
11.00 – 11.30	Coffee available, Rm 107/8 Crew Building
11.30 – 12.00	<b>Welcome and Introduction to School of GeoSciences Postgraduate Studies</b> Grant Institute Hutton Lecture Theatre 11.30 Martin Seigert, Head of School 11.40 Wyn Williams, Head of Research Training & Development 11.50 Dodie James, Health & Safety Adviser 12.00 Library and Data Library Introduction, David Carroll and Robin Rice
12.30 – 14.00	<b>Lunch</b> 302/304 Crew Building, KB
15.00 – 17.00	<b>Intro to GIS and RS courses</b> Room 4 Crew Building Annex, KB
<b>Wednesday, 17 September</b>	
10.00 - 13.00	<b>First Steps: Introduction to the GeoSciences Computing Environment</b> (Bruce Gittings) Room 2.13 and Computing Labs, Institute of Geography, Drummond Street
12.30 – 14.00	<b>MSc reception and viewing of optional course information displays</b> Room 4, Crew Building Annex, KB Find out more about the Environmental/Ecology options available. Posters describing the courses will be on display in the Crew Building Annex all week.
14.00 - 17.00	<b>GeoSciences Computing: Getting to Vital PC Applications</b> (Bruce Gittings) Room 2.13 and Computing Labs, Institute of Geography, Drummond Street

\* **TEAM (Test of English at Matriculation)**. This test is NOT used to decide your admission to any courses. It is merely used to assess how you may benefit from the various ELTT (English Language Testing & Tuition) courses. These courses are offered free of charge and run during semesters 1 and 2. Further information and alternative times to take this test are given on the following web page:  
[http://www.ials.ed.ac.uk/EL/English-Academic/Testing\(TEAM\).html](http://www.ials.ed.ac.uk/EL/English-Academic/Testing(TEAM).html).

<b>Thursday, 18 September</b>	
10.00 – 16.00	<b>Sports and Societies Fair</b> Societies Centre, 60 The Pleasance

(tbc)	Drop in any time to find out about the wide range of leisure activities available
10.00 - 12.00	<b>GeoSciences Computing:</b> Introduction to UNIX (Bruce Gittings) Room 2.13 and Computing Labs, Institute of Geography, Drummond Street
14.30 - 16.00	<b>GeoSciences Computing:</b> Advanced UNIX Topics (Bruce Gittings) Room 2.13 and Computing Labs, Institute of Geography, Drummond Street
16.00 - 17.00	<b>GeoSciences Computing:</b> Connecting from Home and Tie-Up Session Drop in Session, (Bruce Gittings) Room 2.13 and Computing Labs, Institute of Geography, Drummond Street
<b>Friday, 19 September</b>	
10.30 – 12.30	<b>Remote Sensing Computing:</b> Additional computing information for students on GeoScience and Remote Sensing (Hugh Pumphrey) Room 301 Crew Building
12.30 – 13.30	<b>Lunch</b> Room 302 Crew Building, KB
14.00 – 15.00	<b>Individual photographs</b> Photographic Studio, John Murray Labs, KB Visit to studio for individual student photographs.
14.00 – 16.30	Hugh Pumphrey, MSc Programme Director, available for meetings with individual students, Room 313 Crew Building
12.30 – 16.30	<b>Matriculation</b> Recommended Matriculation times for PG Study, Adam House, Chambers Street, if unable to matriculate on Monday 15 September.
14.00 or 15.00 or 16.00	<b>TEAM tests *(for non native English speakers)</b> Institute of Applied language Studies, 21 Hill Place
19.30 – 00.00	<b>Graduate School Ceilidh</b> Tickets £3 from PG Secretaries
<b>Sunday, 21 September</b>	
09.00 – 12.30 or 13.30 – 17.00	<b>Study Orientation for International Taught PG Students</b> International Office (David Hume Tower Lecture Theatre A, George Square)
<b>Monday, 22 September</b>	
09.00	<b>Opening of Classes – check timetable for optional courses</b>
<b>Tuesday, 23 September</b>	
09.00	<b>Fundamentals for Remote Sensing (Compulsory Course)</b> Rm 302, Crew
16.00 – 18.00	<b>College of Science and Engineering Reception for all new Postgraduate Students</b> Grange Room, KB House

## 4.1 Matriculation

Matriculation is the administrative act of becoming a student of the University. It carries with it the obligation to abide by the rules of the University, including the payment of fees and other tuition costs. It entitles a student to pursue the programme of study to which he/she was admitted and accords the privilege of access to student services and facilities in the University. Matriculation is a process, which comprises several different elements, as shown below:

1. You should attend for Registration in Adam House, Chambers Street on Monday, 15 September at any time from 12.30 to 16.30 or on Friday, 16 September from 12.30 to 16.30.
2. All new students must bring the following documentation to registration:
  - Registration pack with completed forms. It will speed up the registration process if you have completed and signed all forms prior to arrival in Adam House.
  - Formal proof of identity – a passport, birth certificate, identity card of an EU country, or a UK driving licence if it contains an integral photograph.
  - A letter of award or other document stating who is paying your fees (the original document not a copy). If you are personally liable for the payment of any part of your fees, you will be expected to make arrangements for payment at registration, and to bring the relevant paperwork with you.
  - If you have transferred funds in advance to the University's bank account, or paid through the University of Edinburgh Electronic Receipting Application for payment of tuition fees, please bring a copy of the payment information.
  - More information regarding matriculation can be found on the website:  
[www.registry.ed.ac.uk/matriculation/student.htm](http://www.registry.ed.ac.uk/matriculation/student.htm)
3. Meeting with your Programme Director to discuss your programme of study and to make an initial selection of optional courses. During the Introductory Week, students should have a meeting with the Programme Director regarding course choice (this will take place on Friday 19 September). Students will be expected to have made up their minds about their choice of first semester courses, in consultation with the Programme Director, by the first day of semester (22 September 2008). Changes after that will only be allowed for compelling reasons and with the approval of all staff involved.

## 5 Taught Courses

### 5.1 Timetable

**Semester 1: Block 1** (22 September – 24 October 2008)

*Courses in Bold type are compulsory*

*Figures in brackets [x] indicate the number of credits*

Monday	Tuesday		Wednesday	Thursday		Friday		
	am	pm	am	pm	am	pm	am	pm
Introduction to Spatial Analysis [10] 14:00-16:00 Room 2.13 Geography  16:00-18:00 Room 1.26 Geography Drummond St	<b>Fundamentals for Remote Sensing</b> [10] 09:00-13:00 Crew 302 KB	Principles of GIS [10] 14:00-16:00 0 HSY LT  16:00-18:00 0  Room 2.02 Geography	<b>Research &amp; Project Management Skills</b> [10] 11.00-13.00 Room 2.13 Drummond Street Or Crew 301 KB		*Inverse Theory [10] 09:00-11:00 00 Crew 301, KB	Spatial Modelling [10] 14:00-16:00 Room 2.05  16:00-18:00 Room 1.26  Geography Drummond St	*Radiative Transfer [10] 10:00-12:00 Crew 301, KB	<b>GIS in the Field</b> [10] 14.00-16.00 Room 2.13  Seminars [10] 16:00-18:00  Geography Drummond St

**Semester 1: Block 2** (27 October – 28 November 2008)

*Courses in Bold type are compulsory*

*Figures in brackets [x] indicate the number of credit.*

Monday		Tuesday		Wednesday		Thursday		Friday	
am	pm	am	pm	am	pm	am	pm	am	pm
Object Oriented Software Engineering: Principles [10] 9:00-11:00 M2B Appleton Tower	Distributed GIS [10] 14:00-16:00 0 Room 2.13 Geography Drummond St	<b>Applied Image Processing</b> [10] 9:00-13.00 Crew 302, KB		<b>Research &amp; Project Management Skills</b> [10] 11:00-13:00  Crew 301, KB		* Inverse Theory [10] 09:00-11:00 Crew 301 KB		* Radiative Transfer [10] 10:00-12:00 Crew 301 KB	GIS in the Field seminars [10] 16:00-18:00 Room 2.13 Geography Drummond St
Object Orientated Software Engineering: Practical [10] 11:00-13:00 Computer Lab Geog	Distributed GIS Practical [10] 16:00-18:00 0 Room 1.26 Geog								

Drummond St	Drummond St								
-------------	-------------	--	--	--	--	--	--	--	--

**Semester 2: Block 3** (12 January – 13 February 2009)*Courses in Bold type are compulsory**Figure in brackets [x] indicate the number of credits*

Monday		Tuesday		Wednesday		Thursday		Friday	
am	pm	am	pm	am	pm	am	pm	am	pm
	Hyper-spectral Remote Sensing [10] 14:00-18:00 Room 3.18 Geography Drummond St		Advanced Spatial DB Methods [10] 14:00-16:00 Room 2.01 16:00-18:00 Room 1.26 Geography Drummond St	Geo-Informatics [10] 11:00-13:00 Room 3.18 Geography Drummond St			Object Oriented Software Engineering Spatial Algorithms [10] 14:00-16:00 M2B/1.03 Appleton Tower		
			Advanced Spatial DB Methods Practical [10] 16:00-18:00 Computing Lab Geog Drummond St				Object Oriented Software Engineering Spatial Algorithms Practical 16:00-18:00 [10] Room 1.26 Geography Drummond St		

**Semester 2: Block 4** (16 February – 20 March 2009)*Courses in Bold type are compulsory**Figure in brackets [x] indicate the number of credits*

Monday		Tuesday		Wednesday		Thursday		Friday	
am	pm	Am	pm	am	pm	am	pm	am	pm
Geovisualisation [10] 09:00-11:00 Room 2.13 11:00-13:00 Room 1.26 Geography Drummond St		<b>Contemporary Issues in Earth Observation</b> [10] 09:00-13:00 3.18 Hutton Room Geography Drummond St		LiDAR [10] 09:30-13:00 Room 3.18 Geography Drummond St			GIS & Society [10] 14:00-18:00 Room 3.18 Geography Drummond St		

## 5.2 Course descriptions – Remote Sensing

### **Applied Image Processing**

**Dr TJ Malthus**

This course examines the practical applications of image processing for analysing images from both passive and active remote sensing systems. Techniques applicable to optical, thermal and microwave methods are covered but greatest emphasis is given to optical techniques. Emphasis is placed on gaining a practical understanding of the principles behind each technique and a consideration of their appropriateness in different applications. Practical experience in the utilization of remotely sensed data and in image processing techniques will be gained using the ERDAS IMAGINE image processing software through a series of unsupervised practical projects designed to complement lecture material. Emphasis will also be placed on the importance of image interpretation.

### **Contemporary Issues in Earth Observation**

**Dr Iain Woodhouse**

This course sets out to summarise the current scientific questions relating to the Earth system and especially global climate change, and to provide an overview of remote sensing techniques used for addressing these issues. It explores more widely the remote sensing techniques that are used to study planetary scale processes, and conveys the importance of such measurements to our understanding of the Earth. The course goes on to examine the ways of acquiring global-scale data with consideration of their limitations as well as their benefits and considers issues of data quality, accuracy, validation and reliability, when assessing the value of remotely sensed data, particularly within the context of measuring global scale changes. It concludes by introducing ideas for future methods of monitoring the Earth.

### **Fundamentals for Remote Sensing**

**Dr Chris Merchant**

This course introduces the principles lying behind remote sensing, concentrating on space-borne platforms. The fundamentals of electro-magnetic (EM) radiation are explained, as are its interactions with Earth's surface and atmosphere. The course goes on to examine sensor characteristics, satellite orbits and various current and future missions involving a range of sensors across the visible, radar and microwave components of the spectrum.

### **Hyperspectral Remote Sensing**

**Dr Tim Malthus**

The course aims to provide an introduction to hyperspectral remote sensing methods, systems for the collection of data at high spectral resolution and unique approaches and algorithms to the processing of such data. The case is made for the greater use of hyperspectral reflectance data. Taking a bottom-up approach the course will first visit optical modelling, spectral signatures and their collection at the Earth's surface using instruments and techniques of field spectroscopy, and finally deal with hyperspectral imaging instruments and images. Practicals will be undertaken in support of these three techniques.

### **Inverse Theory**

**Dr Hugh Pumphrey**

Any set of measurements aimed at inferring something about a parameter of interest contains only a limited amount of information, and in remote sensing the information is often only indirectly related to the target parameter. It is therefore necessary to make the best possible use of the measurements and to understand what information they tell us and what remains undetermined. The aims of this course are that students should understand sufficient “inverse theory” to accomplish this task and be able to apply this theory to relatively simple examples.

### **LiDAR in Remote Sensing** **Dr Genevieve Patenaude**

This course is intended to provide an introduction to the techniques used in LiDAR remote sensing. The course covers the underlying principles of the measurement techniques and the interaction of LiDAR signals with natural surfaces and the atmosphere. The course introduces the different airborne and satellite systems and related data processing methods. The student will also gain knowledge of the different applications of this RS approach for monitoring various aspects of the Earth's atmosphere, cryosphere and terrestrial surfaces. Urban and archaeological applications will be also addressed. Emphasis will nevertheless be given to forestry.

### **Radiative Transfer** **Dr Chris Merchant**

Radiative transfer is the theory that describes how electromagnetic radiation propagates through and interacts with matter. The varied imprints of these interactions on top-of-atmosphere radiance spectra are the data that make possible much remote sensing. Account also needs to be taken of the transfer of radiation through the observing instrument to its detectors. The aim of this course is therefore that students understand radiative transfer theory at a level of detail sufficient to underpin remote sensing of surface characteristics and of the state of the atmosphere.

### **Research and Project Management Skills** **Dr Hugh Pumphrey**

How should one set the scope for, plan and execute a scientific research project? What techniques and tools are available to help the researcher have a clear focus and realistic approach to their work? The aim of this RPMS course is to help students with such questions in the first phase of their research project work and to develop the necessary programming skills. The course culminates in a post-grad conference in which students present the research proposals they have developed as their dissertation topic.

### 5.3 Course descriptions – Geographical Information Science (GIS)

<b>Advanced Spatial Database Methods</b>							
Course Organiser: Bruce Gittings							
<p>Description: This course builds on the theory and techniques taught in the Spatial Modelling course, with the aim of extending and deepening appreciation of formal database management. The course begins by looking further at relational database management systems, considering a means of assessing the 'relational-ness' of such systems, together with SQL particularly in the context of standardisation efforts. The course continues by examining Object-Oriented and Object-Relational approaches, together with issues important to GIS such as hybrid vs. integrated data models and the long transaction. The course extends student's knowledge of commercial data models, reviewing their advantages and disadvantages, together with looking at case studies of database management in the commercial GIS environment. Practicals extend the student's knowledge of standard SQL, examine Oracle Spatial in detail and introduce MySQL and its spatial extension.</p>							
<p>Learning Outcomes:</p> <ul style="list-style-type: none"> <li>• understand the benefits of formal database management and its implications</li> <li>• understand how database methods can be used to store spatial and attribute data in the context of geographical information systems</li> <li>• critically review the different technologies and commercially-available models, assessing their merits and shortcomings</li> <li>• understand the concepts of data modelling and be able to deconstruct real-world problems into appropriate models using appropriate tools</li> <li>• use Structured Query Language (SQL) for the manipulation of objects within a relational database management system</li> <li>• use and understand the Oracle relational database management system</li> <li>• use and understand Oracle Spatial as a means of storing and manipulating spatial data alongside attributes</li> <li>• Understand the issue of performance in the context of database management</li> <li>• contrast Oracle with different systems</li> <li>• predict future developments and understand the implications of standardisation efforts</li> <li>• locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic</li> <li>• develop reasoned arguments, firmly grounded in the available literature</li> <li>• plan and write assignments, within the specified parameters and to a professional standard</li> <li>• take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience</li> </ul>							
Lecture	50%	Seminar / Tutorial / Workshop	10%	Laboratory	40%	Field	

<b>Distributed GIS</b>							
Course Organiser: Bruce Gittings							
<p>Course Description: This course introduces students to the concepts, technology and benefits of distributed GIS services, in contrast to monolithic systems. The underlying technology of computer networks and the Internet are explained. Emphasis is placed on web-based systems, although consideration is also given to real-time systems and location-based services accessible via mobile devices. Web mapping systems are explained in detail, including GoogleMaps and developments in data to feed these systems, together with the impact of Web 2.0, are reviewed. The importance of standards is highlighted, and OpenGIS and other key standards are explained. Practicals and exercises will examine open-source and commercial solutions to serving geographical data.</p>							
<p>Learning Outcomes:</p> <ul style="list-style-type: none"> <li>• understand the value of distributed geographical information and services</li> <li>• understand the value of networked information and the organisation-wide deployment of a system</li> <li>• understand the technological underpinnings of distributed GIS and the restrictions inherent in both hardware and protocols, mitigating strategies and opportunities</li> <li>• predict future developments and understand the implications of standardisation efforts</li> <li>• appreciate the importance standards such as the OpenGIS web mapping suite</li> <li>• understand the concepts of interoperability</li> <li>• become familiar with tools to create distributed web services</li> <li>• be aware of contemporary debates in the industry relating to distributed GI services</li> <li>• locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic</li> <li>• develop reasoned arguments, firmly grounded in the available literature</li> <li>• plan and write assignments, within the specified parameters and to a professional standard</li> <li>• take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience</li> </ul>							
Lecture	55%	Seminar / Tutorial / Workshop	10%	Laboratory	35%	Field	

<b>Geovisualisation</b>							
Course Organiser: Dr William Mackaness							
<p>Course Description: The course explores theoretical and practical aspects of visual cognition, examining mechanisms by which we represent and understand the world around us. These ideas underpin models of cartographic communication. The course also explores ideas in human computer interaction as a prerequisite to the understanding of how technology has been utilised in the automation of the art and science of cartography. Ideas of scientific visualisation are extended, exploring greater levels of immersion afforded through visualisation of high dimensional geographic space. These ideas lead naturally to ideas of virtual reality. When combined with mobile technologies we can further explore ideas of augmented reality and begin to understand the constraints in the design and utilisation of intelligent spatial technologies. The practical element will explore the use of visualisation software that enables the exploration of geographic information.</p>							
Learning Outcomes:							

- Generally locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic;
- Develop reasoned arguments, firmly grounded in the available literature;
- Plan and write assignments, within the specified parameters and to a professional standard;
- Take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience;
- Specifically; to gain an understand of the processes of visual cognition, and visualisation methodologies;
- To have an understanding of cartography, focusing on contemporary applications in the context of automated cartography;
- To understand ideas of human computer interaction in the context of interactive visualisation and exploratory data analysis, and to know how to apply these techniques;
- To know the relative costs and benefits of a range of visualisation methodologies;
- To explore developments in virtual reality and their application in augmented reality through the affordance of mobile technologies.

### GIS in the Field

Course Organiser: Iain Cameron

The course is comprised of two core activities:

- A weekend field course in which students will learn how to use a variety of data capture technologies, undertake field based projects, and make institutional visits to understand the various contexts in which geographic information technology is used both in commerce and research. This aspect of the course aims to provide experience and training in certain areas of GIS in a more hands on manner and to apply some of the more theoretical work encountered in lecture courses to real case-studies;
- A series of seminars from invited speaker drawn from National Mapping Agencies, consultancies, politicians and researchers associated with the field of geographic information. The students will explore a variety of debates relating to the GI profession, and gain a clear sense of career opportunities in geographic information science.

The weekend field trip, which you are required to attend, will be held from the 17 - 19 of October 2008.

Learning Outcomes:

- Through staff-led teaching and student-led project work, acquire a set of skills relating to problem-solving and the use of field equipment in the acquisition, management and presentation of geographic information;
- Understand research and business career opportunities in the field of GI, understand the merits and limitations of each;
- Locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic;
- Develop reasoned arguments, firmly grounded in the available literature;
- Develop communication and interactive skills through group work;
- Plan and write assignments, within the specified parameters and to a professional standard;
- Take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience.

Lecture	5%	Sem/Tut/ W	45%	Laboratory		Field	50%
---------	----	---------------	-----	------------	--	-------	-----

<b>GIS &amp; Society</b>							
Course Organiser: Dr Niamh Shortt / Dr Jamie Pearce							
<p>Course Description: This module will examine the interrelationships between GIS and the structures of modern society. Through case studies related to private and public organisations as well as the general public, the broader social implications of GIS will be examined. How GIS systems and spatial data are embedded in particular economic, political, social and legal structures create social barriers affecting the wider use of GIS, such barriers will be debated throughout the module. The way in which GIS is employed in society has the ability to influence values, perceptions and knowledge, this representation of knowledge in GIS will be discussed with particular reference to how information held by marginalized groups of society is represented. Other areas of importance include the impact of internet mapping, public participation and GIS, gender and representation in GIS, ethics and privacy and the use and misuse of GIS. This course is delivered over a series of lectures and seminars, and assessed through an essay (50%) and examination (50%).</p>							
<p>Learning Outcomes:</p> <ul style="list-style-type: none"> <li>• understand how GIS technology is being used to represent information about society</li> <li>• acknowledge the profound effect that the use and misuse of GIS will have on the directions and outcomes of future projects</li> <li>• understand the ethical and regulatory issues, particularly related to privacy and social exclusion, that are raised by the wider applications of GIS in society</li> <li>• understand how different societal perspectives have shaped the availability and management of spatial data and GI technologies</li> <li>• locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic</li> <li>• develop reasoned arguments, firmly grounded in the available literature</li> <li>• plan and write assignments, within the specified parameters and to a professional standard</li> <li>• take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience</li> </ul>							
Lecture	50%	Seminar / Tutorial / Workshop	50%	Laboratory		Field	

<b>Geoinformatics</b>							
Course Organiser: Dr Nigel Goddard / Prof Mark Rounsevell							
<p>Course Description: Agent based models and multi agent systems are a set of modelling techniques that represent an exciting means of intelligently analyzing, designing and building software systems for complex problem solving. An agent is an 'encapsulated computer system that is situated in some environment and is capable of flexible, autonomous action in that environment in order to meet its design objectives'. But how do we develop an agent for a particular task? How do agents share knowledge? What are their benefits over object orientated approaches and conventional approaches to problem solving?</p> <p>This course begins with an overview of agent systems. The focus is on exploring their architecture and requirements through the use of case studies from the GeoSciences. As part of this course, a methodology for agent oriented software development will be presented.</p>							
<p>Learning Outcomes:</p> <ul style="list-style-type: none"> <li>• To gain an understanding of the agent system terminology and development process of</li> </ul>							

agent based systems.

- To understand their strengths and limitations
- To have learnt techniques to design agent-based systems.
- To be able to modify architecture of existing agent systems.
- To develop that understanding through the exploration of case studies.
- Locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic
- Develop reasoned arguments, firmly grounded in the available literature
- Plan and write assignments, within the specified parameters and to a professional standard
- Take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience

### Introduction to Spatial Analysis

Course Organiser: Dr Neil Stuart

Course Description: This is an introductory course in spatial analysis, covering some of the common methods for analysis of point, line and areal data using geographic information systems and related software. Topics covered include: a background to spatial analysis in Geography; considering what is special about spatial data; spatial autocorrelation; the modifiable areal unit problem; basic geometric frameworks for describing and analysing phenomena; distance metrics; gridded space; overlay analysis; cost surfaces; suitability analysis; Boolean and continuous classifications; network spaces; shortest paths through networks; errors and uncertainty in geographical data. The course is taught by a mixture of lectures and practicals. Assessment is based in equal part on a grid analysis practical project and on examination performance.

Learning Outcomes:

- Understand the main spatial data types and geometrical frameworks with which spatial data are analysed;
- Understand the assumptions and use of the more common methods for analysing point, line and areal data;
- Have some practical experience of using these techniques in GIS;
- Have developed skills in presenting technical information about a method of analysis by oral and written means;
- Locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topics;
- Develop reasoned arguments, firmly grounded in the available literature;
- Plan and write assignments, within the specified parameters and to a professional standard;
- Take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience.

Lecture	55%	Seminar / Tutorial / Workshop	15%	Laboratory work / Practicals	30%	Field	
---------	-----	-------------------------------------	-----	------------------------------------	-----	-------	--

**Object Oriented Software Engineering: Principles**

Course Organiser: Dr Nick Hulton

Course Description: The course aims to provide a basic introduction to software object oriented engineering principles using Java. The course introduces a basic set of programming fundamentals such as input/output techniques, selection statements, iterative loops, recursion and basic data structures. It teaches formal class design techniques to address programming tasks and emphasises error elimination and testing strategies in code development. Practical work is central to learning on the course both in supervised sessions and during the participants own time.

Learning Outcomes:

- understand the fundamental principles underlying Object-Oriented software design.
- employ formal methods to produce effective software designs as solutions to specific tasks.
- develop structured sets of simple user-defined classes using Object-Oriented principles to achieve overall programming goals.
- write simple programs in Java to undertake basic Input/Output and to perform simple data manipulation.
- develop error identification and testing strategies for code development.
- locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic.
- develop reasoned arguments, firmly grounded in the available literature.
- plan and write assignments, within the specified parameters and to a professional standard.
- take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience.

**Object Oriented Software Engineering Principles: Spatial Algorithms**

Course Organiser: Dr Nick Hulton

Course Description: The course assumes a working knowledge of Java and of Object-Oriented design principles and uses these to develop understanding of computational algorithms used to manipulate and analyse spatial data. A range of examples is used to identify generic algorithmic principles. Concepts of algorithm efficiency are addressed but emphasis is also placed on clarity of design and implementation. There is a strong practical emphasis to learning on the course. "Object-Oriented Software Engineering Principles" is normally a pre-requisite for this course.

Learning Outcomes:

- understand how different spatial data models can be implemented in object-oriented designs.
- understand the principles of algorithm development and of generic concepts employed in algorithm design.
- be familiar with a range of algorithms used to manipulate and analyse spatial data.
- develop Java classes suited to the representation and analysis of spatial data.
- appreciate the concept of algorithm efficiency, how this can be assessed and improved.
- undertake spatial data Input/Output in standard formats with other proprietary software.
- locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic.
- develop reasoned arguments, firmly grounded in the available literature.
- plan and write assignments, within the specified parameters and to a professional

standard.

- take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience.

### Principles of Geographical Information Science

Course Organiser: Dr William Mackaness

Course Description: This course provides an essential background for students with limited knowledge of the field and as a foundation for other postgraduate courses. The course begins by tracing the origins and recent rapid development of GIS. Different models that GIS employ to represent real-world entities are presented (vector and raster data models). Also considered are the effects that these models and the analytical functionality of systems have on the information that can be derived. The basic elements of graphic design and communication are reviewed together with co-ordinate reference systems, and map projections. A series of case studies are used to illustrate the breadth of application of GI technology. A series of associated practicals reinforce lecture material and provide a practical hands-on introduction tailored for new users of GIS.

#### Learning Outcomes:

- understand the components and range of methods which make up geographical information systems and the field of geographical information science
- have a general understanding of developments in the field of GIS
- understand the importance of both spatial and attribute data within the GIS database
- appreciate the fundamental difference between raster and vector data
- understand how spatial data are acquired and stored and the importance of map projections
- appreciate the functionality of the ArcGIS software
- use ArcGIS for basic spatial analysis, classification, query, integration of vector and raster data and visualisation
- import and export data in ArcGIS and be able to link spatial data to attributes
- apply appropriate cartographic principles in the construction of maps
- develop an integrated practical project, drawing on appropriate source data, providing sensible analysis, output and drawing appropriate conclusions
- locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic
- plan and write assignments, within the specified parameters and to a professional standard
- take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your own learning experience

<b>Spatial Modelling</b>							
Course Organiser: Bruce Gittings							
<p>Course Description: This course provides a broad introduction to the methods of representing the real world and storing geospatial information. Lectures explain the theory behind storage models and structures, emphasising vector and raster models, with a review of 2.5 (layer-based) and 3-dimensional and temporal structures. The course introduces database management systems and database methods in the context of GIS, ISO and Open GIS standards. A practical stream provides a robust introduction to SQL using the Oracle relational database management system and an exercise in digital terrain modelling.</p>							
<p>Learning Outcomes:</p> <ul style="list-style-type: none"> <li>• understand the range of methods used to store spatial and attribute data in the context of geographical information systems</li> <li>• appreciate the development of these storage models and structures, together with database methods, and the implications of their legacy on current implementations</li> <li>• understand the concept of database management and its implications</li> <li>• critically review the available models and technologies, assessing their merits and shortcomings</li> <li>• understand the concepts of data modelling and be able to deconstruct real-world problems into appropriate models</li> <li>• use Structured Query Language (SQL) for the manipulation of objects within a relational database management system</li> <li>• use the Oracle relational database management system</li> <li>• locate, read and summarise relevant literature, from both traditional and electronic media, to extend your understanding of the topic</li> <li>• develop reasoned arguments, firmly grounded in the available literature</li> <li>• plan and write assignments, within the specified parameters and to a professional standard</li> <li>• take responsibility for your own learning through reading and the preparation of assignments, and reflect upon your learning experience</li> <li>•</li> </ul>							
Lecture	55%	Seminar / Tutorial / Workshop		Laboratory	45%	Field	

## 5.4 Courses – other options

The following courses are available to students of Geoscience and Remote Sensing *in principle*, but are not timetabled in an integrated fashion, and are therefore may not be available in practice in any given year. As well as taking note of any timetable constraints, you are advised to discuss with the programme director the suitability of any of these courses should you be interested.

From within the **School of GeoSciences**, available courses (all of which are **20 credit** courses unless stated otherwise) are:

### Semester One

Atmospheric Quality and Global Change  
 Culture, Ethics and Environment  
 Ecosystem Management  
 Foundation in Ecological Economics  
 Human Dimensions of Environmental Change and Sustainability  
 Integrated Resource Management  
 International Development  
 Principles of Environmental Sustainability  
 Project Appraisal  
 Recent Global Environmental Change [10 credits]  
 Research Methodology  
 Soil Protection and Management

### Semester Two

Applications in Ecological Economics  
 Environmental Impact Assessment  
 Forests and Environment  
 Integrated Resource Planning  
 Land Use-Environment Interactions  
 Management of Sustainable Development  
 Participation in Policy and Planning  
 Rural Development  
 Society and Development  
 Waste Reduction and Recycling

The following are example courses in the **School of Informatics** that may be of interest (these are mostly **10 credit** courses). Further information is available from the links on the Informatics web pages: <http://www.inf.ed.ac.uk/postgraduate/mscareas.html>

Advanced Vision	Learning from Data
Computer Graphics	Modelling and Simulation
Data Mining and Exploration	Neural Computation
Fundamentals of Artificial Intelligence	Parallel Programming Languages and Systems
Informatics	Software Engineering with Objects and Components
Introduction to Java programming	Visualisation
Introduction to Vision and Robotics	

Please note courses taken from outside the School of GeoSciences may follow different assessment patterns with exams and assessment deadlines falling outwith the usual times of assessment for GeoSciences. For example, a semester 1 course maybe examined in the June exam diet.

## 6 Assessment

Courses are assessed by a mix of coursework assignments and examinations. The mix varies between courses. All assessed work (coursework, examinations and dissertation) will be marked in accordance with the University Common Marking Scheme, set out in Appendix 1.

### 6.1 Coursework Assessment

Student performance in many of the courses of formal teaching is evaluated partly or wholly by assignments. The conduct of this assessment is the responsibility of the course organiser and will usually be in the form of a written piece of work. However, oral and other presentations may be used if this is considered more appropriate by the course organiser. The Research and Project Management Skills course will provide training in essay-writing and presentation of your work.

**All written assignments should be retained as a portfolio of coursework by the student for scrutiny by the External Examiner. Assignments presented to the External Examiner must be the original version as returned by the marker and must include the marker's comments and the mark given. You may also be required to submit an electronic version of assignments through the virtual learning environment, WebCT.**

All students must notify their course organiser and their Programme Director if any assessment submission is likely to be delayed. Extensions can be granted for good reason but must be arranged before the deadline. The penalty for late submission of work is severe and will be imposed as follows:

Delay / working days	Subtract, %
1	5
2	10
3	15
4	20
5	25
>5	100

Coursework that is submitted more than 5 working days late is awarded zero marks. Work which is not presented at this time will be deemed not to have been undertaken. Exceptions to the above scale are:

- for **other courses**, e.g., option courses run by different programmes or Schools within the University
- for assignments (e.g., set problems) **where a “model” answer is distributed to the class** after the hand-in time; in such a case late submission necessitates zero mark
- for the **project dissertation and web pages**, whose deadlines are absolute (late submission implies an automatic fail) and can only be extended for valid reasons such as certified medical absence

These penalties do not apply to students who have informed the course organiser and the programme director of difficulties and have received permission to submit late. Extensions to the deadlines will only be allowed by the course organiser if there are good reasons beyond the student's control. If you are ill during periods where course work is in preparation or during the research phase, you should always obtain a medical certificate and give this to the programme director.

## 6.2 Examinations

First semester courses are assessed by coursework and examination, second semester courses by coursework only. Each course is examined separately. First semester examinations are scheduled for the period 8 – 19 December 2008. For details of assessment methods for courses taken from outwith the School of GeoSciences, please see the relevant course descriptions (<http://www.drps.ed.ac.uk/08-09/>). Further details regarding the venue and timetable will be posted prior to the examination period. Check, double check, triple check the time and venue of your exam.

The University has a policy of anonymous marking and exam scripts are identified by Enrolment Number or barcodes (which will be provided in the examination hall): please bring your matriculation card with you to the examination to confirm your identity. Be sure to be at the examination room 15 minutes before the exam is due to start.

The exact format of the examinations is the responsibility of the Course Organiser and is stated in the course specification for each course. In most cases students will be required to sit a 1 ½ -hour written examination in which they are expected to answer a mix of questions. Detailed format for a particular course will be discussed with the students by the Course Organiser at the appropriate time. Read and make sure you understand any instructions and the questions before starting to write.

### Open Book examinations:

On some of the courses, at the discretion of the Course Organisers, students are permitted to bring into the examination room any written material that belongs to them. **No books from any library are allowed in the examination room** (this exclusion is to prevent individuals taking out so many books on a subject that other candidates are disadvantaged). Experience has shown that performance in open book examinations is inversely proportional to the number of times written material is referred to. Students should also be aware that the rules on Plagiarism are applied to Open Book examinations (see Plagiarism Policy Section 6.7).

Students whose first language is not English should consider bringing a dictionary into the examinations to ensure that they understand the questions. The University allows the use of printed or electronic dictionaries. These may however be subject to inspection.

### Past examination papers:

Past examination papers for MSc courses can be found online:

<http://www.lib.ed.ac.uk/lib/resources/collections/exams.shtml>.

For 2004-5, 2005-6 and 2006-7 look under “[Geosciences - School of \(Postgraduate Courses\)](#)”

### 6.2.1 Examination Regulations

<http://www.registry.ed.ac.uk/Examinations/examhall.htm>

1. An examination attendance sheet is laid on the desk for each candidate to complete upon arrival. These are collected by the invigilator after thirty minutes have elapsed from the start of the examination. Candidates are not normally allowed to enter the examination room more than fifteen minutes after the time at which the examination is scheduled to begin.
2. Candidates arriving more than fifteen minutes after the start of the examination are required to complete a “Late arrival form” which invites the candidate to provide a reason for being late and requires him/her to sign a statement that they understand that they are not entitled to any additional time. Candidates are not allowed to leave the examination room less than thirty minutes after the commencement of the examination.
3. Books, papers, briefcases and cases must be left at the back or sides of the examination room. It is an offence against University discipline for a candidate to have in his/her possession in the examination any material relevant to the work being examined unless this has been authorised by the examiners.

4. Candidates must take their seats within the block of desks allocated to them and must not communicate with other candidates either by word or sign, nor let their papers be seen by any other candidate.
5. Candidates wishing to attract the attention of an invigilator shall do so without causing a disturbance. Any candidate who causes a disturbance in an examination room may be required to leave the room, and shall be reported to the University Secretary.
6. Personal handbags must be placed on the floor at the candidate's feet; they should be opened only in full view of the Invigilator.
7. An announcement will be made to candidates that they may start the examination, although they may begin without waiting for this announcement. Candidates must stop writing immediately when the end of the examination is announced.
8. Answers should be written in the script book provided. Rough work, if any, should be completed within the script book and subsequently crossed out. At the end of the examination script books must be left on the desk in the examination hall.
9. During an examination, candidates will be permitted to use only such dictionaries, reference books, computers, calculators and any other electronic technology as have been issued or authorised by the examiners. Such authorisation must be confirmed by Registry.
10. The use of mobile telephones is not permitted and mobile telephones must be switched off during an examination and placed with personal belongings at the rear of the Hall.
11. It is an offence against University discipline for any candidate knowingly
  - a) to make use of unfair means in any University examination,
  - b) to assist a candidate to make use of such unfair means,
  - c) to do anything prejudicial to the good conduct of the examination, and
  - d) to impersonate another candidate or allow another candidate to impersonate him/her.
12. Candidates will be required to display their University Card on the desk throughout all written degree examinations and certain other examinations. If a card is not produced, the candidate will be required to make alternative arrangements to allow his/her identity to be verified before the examination is marked.
13. Smoking and eating are not allowed inside the examination room.
14. If an invigilator suspects a candidate of cheating, she/he shall impound any prohibited material and shall inform the Examinations Office as soon as possible.
15. Cheating is an extremely serious offence, and any candidate found by the Discipline Committee to have cheated or attempted to cheat in an examination may be deemed to have failed that examination or the entire diet of examinations, or be subject to such penalty as the Discipline Committee considers appropriate.

### **6.2.2 Notes on Examination Technique and Advice to Students on Examinations**

These are set out in Appendix 2.

## **6.3 Board of Examiners**

The Board is made up of a Chairman, the External Examiner, the Programme Director and course organisers. The Board meets twice in each MSc year to:

- (i) consider student progression. This meeting normally takes place in May. The Board considers student performance during the taught component of the programme, the dissertation proposal and any other relevant matters which have been brought to its attention which may assist in coming to a proper decision. The recommendations for progression to either MSc dissertation or Diploma, listed by matriculation number, are posted on the MSc notice board in the Crew Building.
- (ii) determine final degree recommendations after the dissertations have been examined and having taken into account all available relevant information. This meeting normally takes place in October. The final degree recommendations, listed by matriculation number, are posted on the MSc notice board in the Crew Building.

The conclusions of the Board are fully minuted, the results sheets agreed and signed by the Chairman of the Board and the External Examiner, and submitted to the College Postgraduate Studies Committee.

## **6.4 Role of External Examiner**

The External Examiner is appointed, for a period of 3 years, to ensure that the high standards of the programme are maintained and that the examination procedures are carried out properly and fairly. The External Examiner may recommend that amendments are made to examination questions and to the provisional mark sheets based upon reading the exam scripts and or coursework assignments. The External Examiner is invited to comment on the standards achieved by the students compared with other universities, and on the fairness and aptness of the assessment procedures. After the conclusion of the assessment procedures, the External Examiner reports on the programme in writing to the College Office.

## **6.5 Release of Marks to Students**

The University Marking Scheme and the Marking Guidance designed to ensure consistency in the level of marking are set out in Appendix 1.

Marks for coursework and examinations will be released to students as soon as marking is completed. The marking of assessed work may take several weeks, depending on the other commitments of the academic staff responsible for marking. Marks are inherently provisional and have no status until they are finally approved by the Board of Examiners, which has the power to moderate the provisional marks both upwards and downwards as it considers appropriate. Marks will normally be released to students via the WebCT virtual learning environment, though practice may vary for some courses, particularly those outside the School of GeoSciences. Students should not request marks directly from Course Organisers; the release of marks is the responsibility of the Programme Director and Programme Secretary.

Shortly after the meeting of the Board of Examiners in May, when the marks for the taught component of the programme are approved, students can view a summary of their marks in all courses via the on-line student portal- MyEd. An interim academic transcript can also be issued, if requested.

## 6.6 Meeting with External Examiner/Oral Examinations

The External Examiner will interview a number of students before the Board of Examiners meeting in May. Students are selected to represent the full range of performance within the class so that the External Examiner is able to assess the performance of the student body in general. The interview also presents borderline students with the opportunity to improve their position by demonstrating their knowledge of the subjects in which they have not achieved the required mark. The External Examiner's view of performance at the interview will be taken into consideration by the Board of Examiners when determining the final marks.

## 6.7 Plagiarism Policy

<http://www.registry.ed.ac.uk/Examinations/collegesandplagiarism.htm>

The University's degrees and other academic awards are given in recognition of the candidate's personal achievement. Plagiarism, that is to say, the action of including, without adequate acknowledgement, the work of another in one's own work as if it were one's own, attacks the fundamental principles of scholarship, and the foundations upon which the academic community rests, in denying appropriate credit to the author of the work copied and seeking to secure it for oneself.

Whilst it is perfectly normal in most academic disciplines to make use of another person's ideas and to take factual information from books and articles, the overall structure of the argument being presented, the weighing of the significance of the different points being made, and the final conclusion reached in response to the question posed are all expected to be the student's personal and original work.

Plagiarism could also involve the civil wrong of breach of copyright. Plagiarism could, therefore, be considered fraudulent, and is an offence against University discipline. The University may invoke the following sanctions in cases where a candidate uses the work of another person or persons in this way:

1. the relevant Board of Examiners may, in assessing any piece of work that makes inadequately acknowledged use of another person's work, penalise that piece of work accordingly;
2. action may be taken under the Code of Discipline, where there is *prima facie* evidence of an intention to deceive, and where sanctions beyond those in (i) above might be invoked.

Unattributed excerpts are treated as plagiarism and will normally lead to the essay or dissertation being rejected. Never use material in your assignments or examination answers or dissertation which has been copied directly from a book or article or electronically published material or from a fellow student's work. Where there is suspicion of collusion between students, both students involved may be penalised. The rule is that short attributed quotations are entirely acceptable, but any work which is copied, or even a thinly disguised unattributed summary without any real attempt to rework the material thoroughly, is totally unacceptable. There must be a citation near to the place where the quoted material appears and a full reference put in the bibliography. The innocent misuse or citation of material without proper acknowledgement can constitute plagiarism even in the absence of a deliberate intent to cheat. If in doubt as to what is allowed, please ask the appropriate course organiser or dissertation supervisor.

You will be asked by programme directors and course organisers to sign the University's 'Own Work Declaration' form for any assessed work. Please see (page 49).

Normally assessed work will be submitted electronically and may be subject to automatic checking for plagiarism. Note that computers may be used to detect plagiarism, whether by using something as simple as a search engine such as Google (it is as easy for a marker to find online sources as it is for you) or something more complex for specialized comparisons of work. Some courses will use the JISC plagiarism detection service.

The plagiarism detection service is an online service hosted at [www.submit.ac.uk](http://www.submit.ac.uk) that enables institutions and staff to carry out electronic comparison of students' work against electronic sources

including other students' work. The service is managed by The University of Northumbria on behalf of the Joint Information Systems Committee (JISC) and is available to all UK tertiary education institutions by subscription.

The plagiarism detection service works by executing searches of the world wide web and extensive databases of reference material, as well as content previously submitted by other users. Each new submission is compared with all the existing information. The software makes no decisions as to whether a student has plagiarised, it simply highlights sections of text that are duplicated in other sources. As such, the software is simply used as a tool to highlight any instance where there is a possible case of plagiarism. Passages copied directly or very closely from existing sources will be identified by the software, and both the original and the potential copy will be displayed for the marker to view.

Once work has been submitted to the system it becomes part of the ever growing database of material against which subsequent submissions are checked. The copyright in each work submitted remains with the original author, but a non-exclusive, non-transferable, licence is granted to permit use of the material for plagiarism detection purposes.

There is an on-line demonstration of the system available at: <http://www.submit.ac.uk/>

## 6.8 Cheating

The University's Assessment Regulations state that:

- It is academically fraudulent and an offence against University discipline for a candidate to invent or falsify data, evidence, references, experimental results or other material contributing to any candidates' assessed work or for a candidate knowingly to make use of such material.
- It is an offence for any candidate knowingly to make use of unfair means in any University assessment, to assist a candidate to make use of such unfair means, to do anything prejudicial to the good conduct of the assessment, or to impersonate another candidate or allow another candidate to impersonate him/her in an examination.

Cheating of any kind is an extremely serious offence against the University's Code of Discipline. Any candidate suspected of cheating who has been referred to the Discipline Committee, and found by that Committee to have cheated or attempted to cheat in an assessment, may be deemed to have failed that assessment or the entire diet of examinations, and be subject to such penalty as the Discipline Committee considers appropriate.

## 6.9 Project Work and Dissertation

Students are expected to identify a dissertation topic during semester 1 and present a detailed project proposal near the end of semester 2.

Students who are allowed to progress to MSc dissertation will be required to devote the period from May to August undertaking individual project work on an approved topic. Deadline for submission of the dissertation is Monday, 10 August 2009.

The dissertation will be examined by 2 examiners familiar with the subject area (one of which will be the student's direct supervisor), and may also be examined by the External Examiner. The Board of Examiners will then meet and make the recommendations for the degree awards. The results will be notified formally by the Convenor of the Board of Examiners.

Dissertations may be given a '**Pass with Distinction**' and this mark will be noted on the Academic Transcript. Such a decision distinguishes a piece of work that is of outstanding quality and would need to be strongly supported by the dissertation examiners.

If, in the opinion of the examiners, the dissertation is judged to be marginally unsatisfactory (i.e. contains minor technical or presentational deficiencies), the Board of Examiners may recommend that

the degree is awarded provided that the candidate carries out revisions which will be clearly stated. The candidate will then be given **two weeks** in which to make the amendments and re-present the dissertation, which must then be certified by the internal examiner. This may result in a candidate's graduation being delayed for up to a year.

If the dissertation is judged by the examiners to be of less than satisfactory level and it cannot easily be repaired (i.e. Fail), then the student will normally be awarded a Diploma rather than MSc degree.

The Board of Examiners including the External Examiner is responsible for the final recommendation.

### **6.10 MSc Degree with Distinction**

The award of MSc degree with Distinction marks exceptionally high achievement. After the marks for the taught courses of the MSc are confirmed at an Exam Board meeting in the spring, students will be informed whether they are eligible to be considered for distinction at the final Exam Board.

Students with a distinction or near distinction-level mark (normally >69%) in the taught courses will be eligible. To earn a MSc degree with Distinction, these students must then attain a mark of 70% or greater for their dissertation work.

### **6.9 Appeal**

A student has the right to lodge an appeal against the results of an examination. The semester 'examination' includes any written, practical or oral examination, continuously assessed coursework or dissertation which counts towards the final assessment. The regulations are set out in the *Code of Practice for Taught Postgraduate Programmes* (<http://www.postgrad.ed.ac.uk/MASCODE/DEFAULT.HTM>)

Further guidance is also given on the Policy and Planning web page: <http://www.aaps.ed.ac.uk/regulations/AcAppealsStudent.htm>.

### **6.12 Special Circumstances**

Any personal circumstances for which there is sufficient documentary evidence, and where these circumstances may have adversely affected a student's performance in an assessment, should be reported to the Programme Director in order that they be considered, if necessary, by the Special Circumstances Committee. Responsibility for producing the documentary evidence rests with the student. Where such information has to be presented, the anonymity of the student is maintained, where possible.

## 7 Project Work and Dissertation

### 7.1 Aim

The aims of the dissertation project are to:

- provide students with an opportunity to study at topic of interest to them in depth
- develop the skills needed to design and undertake independent research under supervision
- consolidate and apply the knowledge they gained during the taught programme
- enhance the technical skills they acquired during the taught programme
- develop scientific writing skills, including the ability to
  - write in clear and accessible language
  - adhere to academic practice in written communication
  - sustain a coherent presentation of research methods and results
- gain skill in summarizing research for online presentation

### 7.2 Learning Outcomes

On completion of the dissertation project, we expect students to be able to:

- manage the progress of a long-term project such that a useful result is obtained
- harness their knowledge of remote sensing and image processing for research purposes
- critically assess each step of their research for validity
- explore, using critical judgement, the research literature in their topic
- write an account of their research that meets the specification of an appropriate academic journal
- create a web page summary of their research for a non-specialist audience

### 7.3 Assessment

The assessment is based on (i) a dissertation written by the student of the form and length required by an academic journal, and (ii) a web-page summary of their project for a non-specialist audience. The weighting is 90% for the journal article and 10% for the web page(s).

Guidance on the submissions is found below.

The deadline for handing in the dissertation is **12.00, 10 August 2009**. This deadline is absolute.

The deadline for the project web-page(s) is **12.00, 21 August 2009**. This deadline is absolute.

Note that the assessment can only be based on what you submit, not directly on the work you do during the project phase. Make sure that your submissions do justice to the work you have done, and budget adequate time for writing.

### 7.4 Guidance for the dissertation

#### 7.4.1 Form

The dissertation is to be in the form of an article suitable for publication in a relevant peer-reviewed journal.

Journals that may be relevant include: International Journal of Remote Sensing, Remote Sensing of Environment, IEEE Transactions on Geoscience and Remote Sensing, Applied Optics, Computer Vision, Graphics and Image Processing, Image and Vision Computing, Quarterly Journal of the Royal Meteorological Society.

Writing for a journal has a number of implications. Journals have precise requirements about the format and style used for submissions. Choose your journal and learn these requirements early on: it is much more work to revise into the appropriate form later on, than to do it right from the start. Discuss what journals are appropriate with your supervisor.

Note carefully that the format we require for your dissertation is not the format for *submitting articles to the journal*, but is the final format in which the journal publishes articles (although occasionally these are the same). When you choose a journal note at least the following requirements:

- the word / page limit for articles (this fixes the maximum length of your dissertation)
- instructions about creating figures and diagrams
- the spelling convention (UK or US English)
- use of single or double spacing, full-width or column presentation, font size etc
- the order of sections (abstract, main text, acknowledgements, tables, figures, references ...)
- the style for citations in the text and in the reference list, which must be followed *exactly*

A typical length for a dissertation is 6,000 – 10,000 words, with 10-20 figures. Avoid journals which impose a size limit smaller than this. Some journals offer style files for Word or LaTeX on their web pages. You are recommended to choose such a journal.

You must hand in three paper copies of your dissertation as loose-leaf sheaves with an additional cover-page stating the dissertation title, your name and the date of printing. This information should be placed so as to be visible through the window in the stiff covers in which the dissertations will be ring-bound by the programme secretary.

You must also copy an electronic version (with all text and images embedded) to a directory where it will be retained. We hope that the best of your dissertations will be sufficiently good to be submitted to journals for publication (in your name and with your permission) with little further improvement to them.

#### **7.4.2 Software**

LaTeX or MS-Word or Open Office are usual. If you are unfamiliar with LaTeX, some examples are provided on the degree programme web pages.

For graphs, spreadsheets often give poor results. Either avoid spreadsheets or force them to give publication-quality output. 'This was the best I could get from Excel' is not an acceptable excuse for poor quality graphs. Further advice is provided on the degree programme web pages.

#### **7.4.3 Content**

In scientific papers, the focus is on the main result and/or techniques. The 'blind alleys' and failed attempts that are inevitably part of research are not reported, except in passing. So, if you tried methods X, Y and Z, and only Z worked, you'd probably write 'I used method Z for the main analysis, since trials showed the alternatives, X and Y, gave poor results.' If Z is a well-known, published technique, you would not describe it in detail, but would state Z's main characteristic in a sentence and then give an appropriate reference. If Z is a new technique that you developed, it is appropriate to describe it in detail, while referring to any previous techniques that are similar or which you have adapted.

Accounts of work in scientific papers are not usually historical: i.e., it is not a summary of all the things you did in the order you did them. Instead, part of the intellectual discipline of this form of writing is that you must (i) select your material carefully, to maximise its relevance and importance, (ii) structure your material to make it logical and understandable, even if you arrived at the material in a different order, and (iii) balance the amount of detail describing different aspects of your project so as to emphasize the important and the novel aspects in the limited space available. Do not put too much technical detail or mathematical derivation in the main body of a paper if it distorts the readability of your text: instead, relegate this material to one or more appendices.

Do not include local references (e.g., names of computers).

Scientific papers do not include software listings or detailed software descriptions. However, if software development was the major task of the project, a flow chart may be appropriate to capture the main aspects of the software. Any code that could be useful for future projects should be copied to the same location as your electronic version of the dissertation. Always comment your code fully, both for your benefit as you proceed with your project, and for the benefit of future users.

All graphs should have comprehensive captions, sensible scales of axes, and clear labelling. All diagrams should be fully legible *when reproduced at the size they would appear in your target journal* (which may be a single-column width, for example). Use black-&-white or discrete grey scales unless colour is essential to effective communication. (Many journals charge large amounts for colour reproduction.)

Every citation in the text must have a corresponding entry in the reference list. Note that a reference list is not the same thing as a bibliography: you need to supply the former, not the latter.

#### **7.4.4 Assessment**

You may find it useful to know what the examiners are asked to look for in your dissertation. A general note to all MSc dissertation examiners states:

“This dissertation represents the final part of a research exercise comprising independent work ... it is unlikely that the dissertation will report notable or original contributions to knowledge. In examining the work please look for

- awareness of the literature and, where appropriate, technical correctness;
- evidence that the candidate has a good understanding of what he or she has been doing and
- a satisfactory literary presentation.

The following questions appear on the examiner's form and must be answered with a YES/NO answer:

- Does the work described in the dissertation show awareness of the literature in the field?
- Where appropriate, state whether the work described in the dissertation is technically correct.
- Do you judge that the candidate has a good understanding of the work that he or she has been doing?
- Is the dissertation satisfactory in its literary presentation?”

The examiner is then expected to give general comments on the work amounting to less than one page and finally to recommend one of the three possible options:

- pass with distinction
- pass
- fail

In this MSc programme, part of a meeting the criterion for satisfactory literary presentation is that the dissertation adheres exactly to the chosen journal's requirements.

The assessment is and can only be based on what you submit. Although the dissertation length may well be relatively short, because of the journal format, the process of selecting and structuring your material is more difficult in a shorter format. Do not underestimate the writing task. Ensure that your dissertation does justice to the work you have actually done.

#### **7.4.5 Publication**

Postgraduate students are encouraged to publish the findings contained in their dissertations, with the supervisor's name included on the publication as a second author. Copies of dissertations should not be released to outside bodies until after approval by the Board of Examiners.

#### **7.4.6 Plagiarism**

Plagiarism is the publication of the work of others as if it is your own. Part of the experience of education is to learn from the thoughts of others. In writing your dissertation, however, all the words should be your own. The only exceptions which are acceptable are:

- when the text is enclosed in quotes and a reference is given to its source.
- when results from someone else are shown for comparison with your own, and a reference to the source of the results is included.

Plagiarism is regarded by the University as a serious offence and can result in no credit being given for work containing plagiarism.

Please refer to the University's policy on plagiarism on:  
<http://www.registry.ed.ac.uk/Examinations/collegesandplagiarism.htm>

#### **7.4.7 Web pages**

A part of the overall dissertation assessment is the creation of web pages describing the highlights of your work, aimed at an educated non-specialist audience. If your work produces results best shown as animations, etc, this can be a useful addition to the dissertation. This is also a useful exercise in a different form of communication, where you need to be succinct and to explain the essence of your work simply. All files for the web pages should be put in a sub-directory of the location for your electronic submission, and should be linked relative to the sub-directory holding the top page: i.e., if all files are then copied elsewhere, all the links still work.

The assessment of the web pages will be by the same examiners who read your dissertation. They will judge whether you have designed a successful summary of your work, and have used this alternative means of communication successfully. The marks scheme is available in Appendix 2 (page 44).

There will be coaching available in web page creation to any who need it in the week after the dissertation deadline.

#### **7.4.8 Doing the project**

Make sure you have a clear objective in mind. Formulate it as a question? Are you answering that question?

During April to July inclusive, there will be 3-weekly project review meetings, at which you are expected to show your progress and measure it against your project plan (Gantt chart). Take advantage of these. In particular, *listen to the feedback carefully*. If someone says 'you need to make sure that in your dissertation you ...', then *pay attention*. It does sometimes happen that students fail the dissertation; but they have always been given, and have ignored, advice that would have allowed them to pass.

Write notes as you go along. You will not remember what you did in one month's time without notes, and this will waste time if you have to re-do anything. Comment all code as you go along; it saves time in the long run. Create graphs in their final form as you go along; even if you end up not using any particular graph, this is easier than trying to re-do a graph later when you realize that you have (for example) mislabelled the axes (and you have forgotten where you put the data file).

Listen to your supervisor's advice.

Be critical about all results. Do they make sense? Are they the right magnitude, do they show the right dependencies, can you interpret them? Your results will be wrong more often than you expect because of mistakes and bugs! Get into the habit of really thinking about the validity of each of your results.

Plan your working day. Give yourself variety: coding, reading, thinking ... plan these activities.

## 8 Academic Guidance and Pastoral Support

The Programme Director is available as a first line of pastoral support and advice for any scholarly or personal issues which may arise whilst you are on the MSc programme. It is your responsibility to inform the Programme Director immediately of any problems that are interfering with your coursework or progress through the programme, including any religious or medical requirements that might affect your participation in any aspect of the programme.

### 8.1 Absences

For one-off absence from lectures the course organiser should be informed but for more prolonged absence students must present a doctor's note or counsellor's letter to the Programme Director.

### 8.2 Illness or Incapacity

All students must inform the Programme Director, as early as possible, if they are suffering from an illness or any other problem likely to affect their academic performance. If students are unable to complete any part of the course, any assessment or any examination due to illness, accident or other reason beyond their control, they are required to submit a doctor's certificate (or equivalent) verifying the reason for non-attendance or non-submission. This information will be brought to the attention of the Examination Board when assessing students' performance. All such information is treated in strict confidence and is only made available to staff on a 'need to know' basis.

Students suffering from any disability affecting performance in examination (e.g. dyslexia) should inform the Programme Director at the start of the programme as well as contacting the Disability Office (section 8.4, below).

### 8.3 Advice and Counselling

If at any stage in the year, especially just before examinations, you encounter any problems or difficulties, please inform the Programme Director. Two other central advisory services are detailed below:

- **The Student Advisory and Counselling Service** (<http://www.student-counselling.ed.ac.uk/>) provides help for students with personal problems which may or may not be related to study. The service is strictly confidential. You can get in touch with the counselling service by phoning 650 4170 (31 Buccleuch Place) or 650 5773 (Weir Building, KB) or emailing [Student.Counselling@ed.ac.uk](mailto:Student.Counselling@ed.ac.uk).
- **The Advice Place** is a drop-in advice centre run by professional staff and student volunteers who are trained to deal with financial, educational and welfare problems. Advice is given on any student matter. The Advice Place is located at: KB House, telephone 650 5822 or at Potterrow, 5/2 Bristo Square, telephone 650 9225. <http://www.eusa.ed.ac.uk/advice/>

### 8.4 Disability Office

Staff in the Disability Office are keen to make contact with students with disabilities as early as possible. If you have a disability (including medical conditions and dyslexia), regardless of whether you indicated this on your application form, we would encourage you to get in touch. This is particularly important if you are likely to require any of the following:

- adaptations to teaching or residential accommodation;
- access to specialist technology;
- alternative ways of accessing teaching and information;
- personal assistance;

- special examination arrangements (if applicable); or
- assistance with claiming Disabled Students Allowance.

If you get in touch, we will be able to:

- ensure that you have a copy of the University's Disability Statement and other relevant information;
- discuss your requirements with you in person or by telephone or correspondence;
- discuss the possibility of alternative examination arrangements;
- offer advice about specialist assessment and access to funding and equipment.

If you are worried about discrimination or are unsure whether or not to disclose a disability to your Department, we will be pleased to discuss your circumstances with you in strict confidence.

### **Additional Information for Students with Specific Learning Difficulties (Dyslexia)**

The University employs a full-time Dyslexia Study Advisor who will be able to help you with all aspects of your study including relevant technology and applying for special examination arrangements.

What you should do:

- make early contact with the Dyslexia Study Advisor;
- bring with you an educational psychologist's report, if you have one;
- be prepared to discuss your specific needs with University academic and support staff.

What we will do:

- arrange assessment of needs, if necessary;
- provide information on course design and content;
- offer study skills support;
- discuss the possibility of special examination arrangements;
- give information about available technology;
- assist with applications for Disabled Students' Allowance.

### **Contact details**

Address: Disability Office, 3 South College Street, Edinburgh EH8 9AA

Email: [Disability.Office@ed.ac.uk](mailto:Disability.Office@ed.ac.uk)

Website: <http://www.disability-office.ed.ac.uk/>

Tel: 0131 650 6828 (Voice); 0131 650 9371 (Text)

## **8.5 Student Feedback and Evaluation**

Student feedback and evaluation is a valued input to curriculum and programme review and development at the University of Edinburgh. Students are asked to complete evaluation forms on each course they take, on the dissertation preparation and supervision and on the degree programme as a whole. Please complete these forms when they are distributed. Informal feedback is welcome at any time.

## 9 A to Z of Facilities and Services

### 9.1 Accommodation

The University has a Student Accommodation Service. The office is located at:

Accommodation Services  
Reception Centre  
Pollock Halls  
Holyrood Park Road  
EH16 5AY  
0131 667 1971

<http://www.accom.ed.ac.uk>

If you wish to make use of this service, you will need your Letter of Acceptance or some other proof of your identity. You may telephone the office from 0900-1630. The Reception Centre is manned 24 hours a day, but an appointment system is in operation.

Students with a 12-month University Accommodation contract should be aware that if they want to terminate their contract in order to go overseas to do fieldwork, they **MUST** let the Accommodation Services know well in advance. Being allowed to break the Accommodation Contract is a concession and not a right.

### 9.2 Banking

Due to the strict guidelines the Financial Services Authority places on banks with regard to money laundering, banks must be able to verify the student's address.

For UK students, the normal address verification procedures involve the production of one of the following:

- Current Council Tax Bill
- Current Local Council Rent Card
- Current Local Council Tenancy Agreement
- Positive Voter's Roll Check
- Utility Bill or Mortgage Statement.

Please check exact details with your bank.

Overseas students should follow the advice given by the International Office:  
[http://www.international.ed.ac.uk/finances/bank\\_account.php](http://www.international.ed.ac.uk/finances/bank_account.php)

For Overseas students, the Royal Bank of Scotland and Halifax Bank of Scotland will accept the following for address-verification procedures:

- the University's Letter of Offer (must be on headed paper). Both conditional and unconditional offers are acceptable.
- Tenancy agreement or student accommodation contract. Tenancy agreements are restricted to those with a local authority/council, housing association, or known and reputable letting agency.

There are branches of the Royal Bank of Scotland and the Halifax Bank of Scotland in the vicinity of King's Buildings. The most accessible Royal Bank of Scotland is in 30 Nicolson Street (Tel: 668

3351), and Halifax Bank of Scotland is in 55 Mayfield Road (Tel: 667 4336) or in Cameron Toll Shopping Centre. There are also ATM facilities for obtaining cash at KB Centre.

Overseas students should remember to **cancel** their cash cards before they leave the UK.

### **9.3 Building Access**

Your matriculation card must be activated so as to allow you entry to the Crew Building's side and back doors. This can be done through Graham Walker (Room 310, Crew Building) upon presentation of your matriculation card.

The MSc teaching primarily takes place in the Crew Building and the Crew Building Annex. All the rooms in the Annex may be used as study rooms when not in use for lectures or meetings. The Annex front door will be locked outwith the normal office hours of 0900–1700, but you can still access the building using the door key pad (code: C2468X). If using the building outwith normal office hours, please remember to sign-in for health and safety reasons.

### **9.4 Catering**

There is a Common Room on the lower floor of the Crew Building that postgraduate students are welcome to use. Tea and coffee are available there throughout the day at cost under a trust system.

Because of the size of the room it would be greatly appreciated if students would allow staff exclusive use of the room between 1050 and 1130. MSc students have generally accepted morning coffee breaks between 1030 and 1050 and 1530 and 1550.

Students are expected to provide their own mugs and to help keep the room neat and tidy.

- **King's Buildings Centre Shop**

Opening times: 0700-1800 (Mon–Fri)

Located on the ground floor of the King's Buildings Centre, next to Blackwell's Bookshop, this general store in the KB Centre offers take away deli filled rolls made-to-order, and acts as grocers, greengrocers, newsagent and minor pharmacy.

- **The Upstairs Cafe**

Opening times: 0830–1630 (Mon–Fri)

The Upstairs Café is located on the 7th floor of the Michael Swann Building. In addition to a range of snack food such as filled baguettes, baked potatoes and panini, each day there are three hot meal choices (one of which is a daily vegetarian) and a hot daily dessert. The Upstairs Café has been awarded a "Healthy Living Award", due to its range of healthy choices across both hot food and snack items.

- **King's Buildings House**

Opening times: 0830–2300 (Mon–Fri)  
0900–1800 (Saturday)  
1200–1800 (Sunday)

Facilities include The Grange (upstairs Food Court) counters available – pizza & pasta, baked potatoes, Grab & Go, selection of sandwiches, wraps & rolls from the chilled cabinet, selection of traditional hot meals including vegetarian option and fast food counter including hot bagels, hot flatbread, burgers and chicken bites.

On the ground floor is the Mayfield Bar and Blackford Lounge both serving traditional pub food, panini, sandwiches, wraps and baguettes, and sandwiches made to order.

- **“The Spot” cafeteria**

Opening times: 0730–1530 (Mon–Fri)

The Spot is located on the first floor within the Kings Buildings Centre and offers a range of hot tasty snacks, such as baked potatoes, panini or toasties with various fillings, baguettes and deli filled rolls which can be made to order or if you're in a rush Grab & Go from our chilled cabinet. There is also a selection of confectionery, cake bars and soft drinks.

### **9.5 Chaplaincy**

The University Chaplaincy offers pastoral care for students regardless of religious affiliation. It provides opportunities to worship, a focus for community and friendship, a chance to exchange ideas, pursue concerns and to ask questions. It is located at 1 Bristo Square, part of the Student Centre Complex in Bristo Square, (Tel: 650 2595/6). <http://www.chaplaincy.ed.ac.uk/>

Honorary Chaplains and religious contacts in Edinburgh are detailed on the 'Faiths' Home Page: <http://www.chaplaincy.ed.ac.uk/faiths.html>.

### **9.6 Email**

When you join the University you will be given a University of Edinburgh (UoE) email account and address, which will be used for a variety of essential communications. You should access and manage this account regularly as the University will send you vital information from time to time and will assume that you have seen and acted on these communications. Failure to access your account will not be an acceptable excuse or ground for appeal. If any of your courses use WebCT, then you will need to ensure that you either check both the WebCT email account and the UoE account, or set up a forward on WebCT to your UoE account so that you have only the one place to check for important UoE email. Information about forwarding WebCT mail can be found at: [http://www.elearn.malts.ed.ac.uk/webct/student\\_faqs.phtml#new\\_mail](http://www.elearn.malts.ed.ac.uk/webct/student_faqs.phtml#new_mail)

### **9.7 English Language**

All non-native English-speaking students are required to sit an English test when they arrive at the university (Test of English at Matriculation). The following website contains a list of test times. There is no need to book in advance: [http://www.ials.ed.ac.uk/EL/English-Academic/Testing\(Team\).html](http://www.ials.ed.ac.uk/EL/English-Academic/Testing(Team).html)

Students will have the opportunity to attend English classes run during the year. Some students will be recommended to sit these classes based on their Test of English at Matriculation result. The following web page contains a list of classes for Semester 1: <http://www.ials.ed.ac.uk/EL/English-Academic/Semester-1-classes.html>

### **9.8 EUSA**

Every student is a member of the Edinburgh University Students' Association (EUSA). It provides services and support for students. It aims to represent the views of students at Edinburgh University, not just to the University itself on academic issues, but also to outside bodies such as the City Council and the Scottish Parliament.

<http://www.eusa.ed.ac.uk/>

### **9.9 Fax**

A fax machine is located next to Room 201 of the Crew Building,. This is available for students' use with a key card, which can be purchased from Room 211, price: £4.00 for 100 units. The fax no. for the Crew Building is +44 131 662 0478.

### 9.10 Feedback

The School welcomes student feedback because it provides an invaluable input to the review and development of both curriculum and programme organisation. You will have the opportunity to complete an evaluation form for each course you complete. You are also encouraged to forward general comments regarding the programme to the Programme Director.

### 9.11 Health & Safety

The Guide to the Health & Safety Policy of the University can be found on: <http://www.safety.ed.ac.uk/policy>. Please take the time to read especially Parts 2 and 8 (General Precautions and Fieldwork & Outdoor Activities). Field work and field visits may involve some inherent risks and hazards.

Please make sure that you also read the 'Code of Practice for Field Studies' at the back of this handbook.

### 9.12 Health Service

The services of the University Health Centre in Bristo Square are available to students. The University Health Service is based at:

Richard Verney Health Centre  
6 Bristo Square  
Edinburgh  
EH8 9AL

**Tel:** 0131 650 2777 (Office hours Mon-Fri)

**Tel:** 0131 668 4427 (Evenings & Weekends – urgent cases only)

**Tel:** 0131 650 8241 (For nurse appointments during consulting hours only)

**E-mail:** [health.service@ed.ac.uk](mailto:health.service@ed.ac.uk)

**Website:** <http://www.health-service.ed.ac.uk>

Consulting hours are:

- 0900-1100 (Mon-Fri).
- 0900-1000 (Saturday) – urgent cases only
- Closed on public holidays.

Otherwise consultation by appointment only.

Appointments with a doctor are free-of-charge under the National Health Service (NHS), but there is a current charge (July 2008) of £6.65 per item of prescribed medicine. A charge is also made for dental and eye care.

Lothian Health Board is responsible for medical care out-of-hours (i.e. between 1800 and 0800 hours, at weekends, and on public holidays). To use this service, please phone **NHS24** ([www.nhs24.com](http://www.nhs24.com)) on **08454 24 24 24**. NHS24 is available for advice 24 hours a day, 7 days a week.

### 9.13 International Office

The International Office is glad to provide information to international students and their families on various matters.

The office address is:

**International Office**

57 George Square

Tel: 0131 650 4296

E-mail: [enquiries.international@ed.ac.uk](mailto:enquiries.international@ed.ac.uk).

<http://www.international.ed.ac.uk/>

The International Students Centre (ISC) is part of the International Office and is an organisation which tries to help international students to settle into their new environment. Website: [www.ed.ac.uk/isc](http://www.ed.ac.uk/isc)

### **9.14 Insurance**

All students are very strongly advised to provide their own personal accident, liability and travel insurance, which may be arranged through the University's Insurance Section in the Finance Office, 9-16 Chambers Street, EH1 1HT (Tel: 0131 650 9154). This is particularly important for students collecting data in the field for their dissertation in the UK, mainland Europe or worldwide.  
<http://www.finance.ed.ac.uk/finweb/insurance/>

### **9.15 Libraries**

Full information about the University Library's services, e.g. joining the library, opening hours, and material available is available at <http://www.lib.ed.ac.uk/>. The library catalogue can be accessed at: <http://catalogue.lib.ed.ac.uk/>. The University Card (issued to every matriculated student) can be used to borrow books from any of the University Library sites.

Students are expected to familiarise themselves with the library and to attend the tour, which will take place during Introductory Week.

- **Darwin Library**

The Darwin Library is situated at the front of the Darwin Building, adjacent to the Swann Building, and is the main source of reference materials for the Environmental Sustainability programme.

#### Opening hours

##### **Semester time:**

0900–2200 (Monday to Thursday)

0900–1700 (Friday and Saturday)

1200–1700 (Sunday)

##### **Vacation time:**

0900–1700 (Monday to Friday)

Closed Saturday and Sunday

##### **Easter Vacation only:**

0900–2000 (Monday to Friday)

0900–1700 (Saturday)

1000–1700 (Sunday)

If you wish to access the library outside these normal opening hours, then you will need to register your matriculation card at the service desk in Darwin Library in order to activate the library doors.

- **Main University Library**

The Main University Library is located in George Square.

#### Opening hours

##### **Semester time:**

0830 to midnight (Monday to Saturday)

1200 to midnight (Sunday)

Desk service:

0830–1950 (Monday to Thursday)

0830–1850 (Friday)

0830–1650 (Saturday)

1200–1850 (Sunday)

**Vacation time:**

0830–2000 (Monday to Thursday)

0830–1700 (Friday)

1000–1300 (Saturday)

Closed Sunday

- **Scottish Agricultural College (SAC) Library**

This library is located on the ground floor of the Peter Wilson Building. You are welcome to use the SAC Library, but you will need to register there and to use the SAC catalogue.

Opening hours

**Semester time:**

0845–2100 (Monday to Thursday)

0845–1700 (Friday)

1000–1700 (Saturday and Sunday)

**Vacation time:**

0845–1700 (Monday to Friday)

Closed Saturday and Sunday.

- **Libraries outside the University**

Edinburgh City Library and the National Library of Scotland are both located on George IV Bridge.

### **9.16 Mail**

Each student is provided with an individual mailbox for the receipt of their mail outside the Common Room on Level 1 of the Crew Building. The postal address of the Crew Building is:

Crew Building  
The King's Buildings  
West Mains Road  
Edinburgh  
EH9 3JN

### **9.17 Photocopy Machines**

Black & white photocopy machines are located in the Darwin library. User cards can be obtained at the Darwin library reception desk. Colour photocopying can be done at the KB Copy Centre in Room 2300 of the JCMB building (Tel: 0131 650 5001).

There are also photocopiers in the Crew Building. You have to select the photocopier from 'Printers and Faxes' and add it to your computer (geosp6 for the photocopier in the Crew level 1, or geosp7 in Crew level 3). You can then print off your material from the selected photocopier by using your pin number, which you can get from the GeoSciences web page:  
[http://www.geos.ed.ac.uk/it/FAQ/printing/show\\_pin.html](http://www.geos.ed.ac.uk/it/FAQ/printing/show_pin.html)

### **9.18 Postal Services**

Inland mail costs 36p for first class and 27p for second-class stamps for letters (240x165mm 5mm thick) up to 100 grams in weight. Rates for larger items or for overseas mailing are available from post offices. The nearest post office from the Crew Building is in Blackford Avenue, about 15 minutes walk away.

### **9.19 Recycling**

A recycling scheme operates in the University. Full details of this policy can be found on the Energy and Sustainability Office website: <http://www.eso.ed.ac.uk/Waste/>.

Collection bins for the recycling of newspapers, magazines, plastic bottles, cans, cardboard, and glass are located between the Joseph Black Building and KB House. For details of all the recycling facilities in the City of Edinburgh see the following web page: <http://www.changeworks.org.uk/>

### **9.20 Shopping**

The most convenient shopping area for the King's Buildings is the Cameron Toll Shopping Centre, about 10 minutes walk away. There is a large supermarket, book shop, two banks, travel agents, and a wide range of other shops including a pharmacy.

The recommended shop for the purchase of text books is Blackwells. There is a small branch serving King's Buildings located on the ground floor of KB Centre. The main shop is located at 53-59 South Bridge, Edinburgh, EH1 1YS (Tel: 622 8222).

### **9.21 Smoking**

In order to promote the health and safety of both students and staff, the University operates a compulsory **No Smoking Policy** prohibiting smoking in its premises, with certain exceptions for residential accommodation and licensed premises.

Since March 2006, smoking is banned in all public places in Scotland <http://www.clearingtheairscotland.com/>

### **9.22 Sport Facilities**

In the KB House, a multi gym, squash courts and sports hall are available, but the main facilities are at the Sports Centre at The Pleasance, the playing fields at Peffermill, and the field centre on Loch Tay, Perthshire. Facilities at the Sports Centre include sports hall, squash courts, circuit and weight training rooms, archery and rifle ranges, boxing and table tennis. Open seven days a week. For more information, see <http://www.sport.ed.ac.uk/>. Information on playing fields at Peffermill and Firth Point Field Centre on Loch Tay is available from the Physical Education Department, 46 The Pleasance, Tel: 650 2585.

### **9.23 Students Union**

Every student is automatically a member of the **Edinburgh University Students' Association** (although the Education Act 1994 gives students the right to opt out of this membership if they wish). EUSA operates Student Union buildings around the University, providing restaurant and bar facilities, entertainment and advice (particularly on student finances). EUSA represents students' interests to the University on academic and matters of policy affecting students. For more information, see <http://www.eusa.ed.ac.uk/>.

### **9.24 Telephone**

The telephones in the Crew Building Annex are available to students for internal calls to staff of the University or the Scottish Agricultural College (SAC) for purposes connected with their studies. To dial University numbers, omit the initial 6 from the 7-digit 650 numbers and dial the remaining 6 digits, e.g. to call external number 650 6708, dial internal number 50 6708. To call numbers in SAC, replace 535 of external number with 77, e.g. for 535 1000, dial 77 1000. A pay telephone can also be found in the KB Centre and KB House.

### **9.25 Travel and Transport**

The University promotes the use of sustainable modes of transport, e.g. cycling, walking and public transport.

Students who have their own vehicles and wish to use University car parks should contact the parking office for an application form and details of car parking charges: <http://www.transport.ed.ac.uk/>

- **Bus travel between campuses**

The University shuttle bus runs during semester time between George Square (Crichton Street) and King's Building (in front of the Roger Land Building). The bus runs at twenty-minute intervals for much of the day. The bus timetable is listed in the Appendix of this handbook and can also be found at:

<http://www.transport.ed.ac.uk/MapsAndTimetables/UniversityShuttleBus/ShuttleBusTimetable.shtm>

- **Buses within Edinburgh**

The King's Buildings campus (in front of the Roger Land Building) is served by the Lothian Bus Number 41 service from the city centre.

Buses to Princes Street and the city centre run from Mayfield Road and the bus stops are within short walking distance from Entrances 3 and 4 of the King's Buildings. Number 24 goes to Lothian Road and the West End, and Number 42 goes to Princes Street via Buccleuch Place and George Square. There are also a number of buses that go to the city centre from Craigmillar Park Road, about 10 minutes walk from KB. The timetables are posted at the bus stops. It is essential to have the **exact** fare as no change is given – at the time of printing £1.10 for a single journey or £2.50 for a day ticket.

If you use the bus regularly it may be cheaper to buy a bus pass from Lothian Buses, 27 Hanover Street (Tel: 0131 554 4494) <http://www.lothianbuses.co.uk/>. The bus pass entitles you to unlimited travel on any Lothian bus, but it does **not** cover night services.

- **Rail travel**

There are discounts for students holding a Student Railcard. Applications for any concessions must be officially stamped (Room 211, Crew Bldg). You will also require 2 passport photos.

When travelling from Edinburgh during the Christmas vacation (especially overseas) make arrangements well in advance because services are heavily booked at this time of year.

### **9.26 Visas for International Students**

With effect from 2 July 2007, the Home Office will automatically refuse to accept an application for a visa extension/renewal if it has not been presented within 28 days of the expiry of the old permission. You are therefore advised to make your application in good time otherwise you may find that your permission to stay in the UK is refused and you are required to leave before completing your studies.

Please contact the International Office if you have queries regarding immigration ([enquiries.international@ed.ac.uk](mailto:enquiries.international@ed.ac.uk)).

## Appendix 1 University Marking Scheme

UNIVERSITY MARKING SCHEME MSc/DIPLOMA			GRADE-RELATED CRITERIA TO BE APPLIED WHEN MARKING	
Mark %	Grade	Description	Mark Awarded	Corresponding characteristics of coursework or dissertation †
90-100	A1	An excellent performance, satisfactory for a Distinction.	95	Showing very significant originality in ideas/argument, factually faultless, focused, perceptive, critical, well-structured & organised, comprehensive. Arguments supported by example or evidence. Extensive evidence of reading with many authors cited by name. Very well written. <i>Exceptional progress made.</i>
80-89	A2		85	Showing significant originality, factually almost faultless, focused, critical, well structured & organised, comprehensive. Extensive evidence of reading. Well written. <i>Exceptional progress made.</i>
70-79	A3		75	Showing originality, factually largely correct, critical, well structured and organised, comprehensive. Extensive evidence of reading. Well written. <i>Excellent progress made.</i>
60-69	B	A very good performance	68	Sound and convincing with moderate evidence of flair/originality. Well structured & organised, fairly comprehensive, factually largely correct with strong evidence of reading beyond basic references. <i>Very good progress made.</i>
			65	Sound and methodical with evidence of some originality, well structured & organised, fairly comprehensive. Factually largely correct, with evidence of reading beyond basic texts. <i>Very good progress made.</i>
			62	Sound and methodical with minimal evidence of originality, fairly well structured and organised, fairly comprehensive. Factually largely correct but with some obvious omissions or mistakes. Evidence of minimal reading beyond basic texts. <i>Good progress made</i>
50-59	C	A good performance, satisfactory for a Master's Degree	58	Competent, structured & organised but lacking in real depth, no real evidence of originality. Reasonably good factual presentation & freedom from error but little more. Methodically covered but subtleties often missed. Evidence of minimal reading beyond basic texts. <i>Good progress made.</i>
			55	Competent, fair attempt at structure and organisation, reasonable factual presentation, but contains some minor errors or missing facts, some conceptual confusion. Often rote-learnt with little added. Flat, with little beyond the obvious. Lacking evidence of reading beyond basic texts. <i>Satisfactory progress made.</i>
			52	Largely competent, but somewhat superficial. Fair attempt at structure and organisation, but with some sections not entirely pertinent and text marred by structural problems or gaps in understanding. Many minor factual errors. No evidence of reading beyond basic texts. <i>Satisfactory progress made.</i>
40-49*	D	A satisfactory performance for the Diploma but inadequate for a Master's Degree	48	Sparse, incomplete or unfinished, poor organisation, many minor errors of fact or conception, shallow or naïve argument, little evidence of reading and only basic level of understanding. Significant sections often irrelevant. <i>Disappointing progress made. [Refer for minor amendments if textual amendments can be done in 2 weeks and bring mark to 50%.]</i>
			45	Sparse, incomplete or unfinished, extremely poor organisation, numerous significant errors of fact or conception, very weak or non-existent argument, very limited evidence of reading, an elementary level of understanding. Large sections often irrelevant. <i>Disappointing progress made.</i>
			42	Very sparse, incomplete or unfinished, factually incorrect or conceptually confused. No attempt at argument, no evidence of any reading, even of basic texts. Only a very basic and limited understanding. <i>Very disappointing progress made.</i>
30-39**	E	Marginal Fail	38	Extremely sparse, incomplete or overly brief, factually incorrect and conceptually highly confused. No attempt at argument. Very basic misunderstanding or entire misconception. <i>Hardly any progress made.</i>
20-29	F	Clear Fail	28	Unacceptably inadequate with no relevance to project objectives, illogical, lacking structure or focus, or showing not even a minimum of understanding. Few basic facts correct, numerous omissions and errors, <i>essentially no progress made.</i>
10-19 0-9	G H	Bad Fail	1-12	Wholly unacceptable answer that may be flippant, minimally brief (one or two paragraphs), totally misconceived, unintelligible or indecipherable. Often characterised by few minimal facts randomly, but often erroneously presented.

† Criteria in *italics* are applicable to dissertation marking only. "Progress made" (i.e., the amount of fruitful work done) should be assessed in relation to the time dedicated to and credits available for the dissertation project.

\* A mark of 47-49 may be used to denote the possibility that, in exceptional cases, by minor revision, the work may be upgraded to masters standard. Taught masters dissertations are not normally open to revision as they are a summative examination medium.

\*\* A mark of 37-39 may be used to denote the possibility that, in exceptional cases, by minor revision, the work may be upgraded to diploma standard.

**Work precisely matching the given characteristics should be awarded the mark in the *Mark Awarded* column. In general, the mark awarded may take any value from 0-100, after taking appropriate account of the mix of standards of performance corresponding to differing characteristics. Written comments on examined work must be consistent with the grade-related criteria relating to the mark awarded.**

## Appendix 2 Notes on Examination Technique

- **Revision**

Get the bulk of basic revision out of the way before the last minute. Spend late stage revision time thinking about the structure of broad topics and possible interrelationships between topics. The examination problem is not a matter of data collection but of data retrieval. Structured data can be retrieved much faster than unstructured data and in an exam, time = marks.

An exam, like a marathon, is only to a very limited extent a question of how you feel on the day. The preparation, i.e. the revision, is all important. Structure on paper your knowledge in broad areas with headings and sub-headings. Attach named and dated literature references, example systems and applications to these headings. Think of relationships and links to other topic areas. In general, use the revision phase to structure and integrate your knowledge, not cram your head full of assorted ill-structured facts. This systematic approach produces very rapid recall of structured data, which is what the examination requires. All the thinking is done beforehand, so the exam period can be used for cogent writing, not scratching your head! As an old Professor used to say - "revision is creative, not transferring dead bones from one coffin to another." However, you probably haven't got time to cover everything, thus choose your topics with care and ensure you have studied sufficient topics in enough detail to ensure you can answer the required number of questions.

- **General points**

Answer one from 4 in a 45 minute exam, although there may be variations, such as an EITHER / OR question or a MULTI-PART question where you have to answer 3 from 5 parts, or 4 from 6 parts. Adjust the level of detail as appropriate.

You need at least 3 sides of average writing (not double-spaced) to cover a topic at this level to a good standard.

Remember the first 50% of marks on a question are much easier to get than the last 50%, so in a two-question exam don't spend an hour on your favourite topic - there are rapidly diminishing returns - stick to time on each question.

Use examples and specific literature references, e.g. Dangermond (1984).

Don't use the same material to answer more than one question. Question vetting by the Board of Examiners tries to eliminate this, but if you see an apparent opportunity to repeat yourself - don't take it! The External Examiner looks at all the answers by a given candidate and he is interested in the breadth, not the reusability of your knowledge!

- **The question**

Make sure you answer the question as stated, don't pick out one word from the title and write all you know about it. If it asks for advantages and disadvantages, discuss both in an organized fashion.

If you are not sure what the question means, avoid it.

If you are clear a question could be answered several ways, or some of the terms could have different definitions, specify what you understand the question to mean and what definitions you will use, in the introduction. Stick to your definitions throughout the essay, don't change your mind halfway through! A cautionary note - the above can be taken too far; redefinition of terms in a manner contrary to standard usage in the literature will expose your ignorance and could result in a very low mark for failure to answer the question.

- **The answer**

The structure of the argument in an essay is very important. Do an essay plan based on appropriate combinations of headings/sub-headings from your revision. Use this to outline your argument in the essay introduction.

Ensure that the argument of your essay follows on logically from paragraph to paragraph. Distinguish major points from more minor ones.

The more general the question, the more specific your answer must be, in terms of well-defined points in the argument and correct use of examples. A very general answer attracts a very mediocre mark.

It is up to you to convince the examiner that you understand the technical terms you are using, by explaining them when you first introduce them. For example, in an essay about relational database design, if you mention Codd's Normal Forms you must explain what they are.

- **Diagrams**

Use quick diagrams if they save words, a work of art takes too much time out of your 45 minutes.

- **Time problems**

If you are in severe time difficulties with a question (a situation to be avoided if at all possible), an outline of your intended answer in note form is better than half a paragraph that barely gets started on the first point. Avoid writing answers in note form under other circumstances.

- **Recovering the fumble**

Everyone does a bad answer from time to time, but they are not always the ones you imagine! So don't let one you think is bad affect your concentration during the exam or your mental health while preparing for the next exam.

### **Advice to Students on Examinations** (*after Professor D.R. Newth*)

1. The examiners want you to do well, and will try hard to see merit in your performance. Your job is to help them.
2. Always read through all the questions of the relevant sections before starting to answer any of them. Always attempt the number of questions required of you. The first few marks on any question are the easiest to earn and you will get "grace" marks for a very feeble or brief answer if it reveals that at least you know what the question is all about.
3. **Read the question and answer it.** You may feel that a different question would have been more interesting, and you may be quite right, but how is the examiner to know that you are not just ignorant and/or silly if you wilfully evade the plain meaning of the question as set?
4. If asked to "Describe" or "Give an account of" a natural phenomenon it is entirely proper that your answer should be mainly an orderly presentation of data ("facts"), though you should always try to show, however briefly, that you understand the wider significance of what you are describing and the problems it presents. If asked to "Discuss" or "Write an essay on", you are being invited to express views, your own and other people's, and to criticise them. A wholly "factual" answer is then inadequate even if it reveals a remarkable knowledge of the relevant material. It cannot earn high marks. The data you mention must be placed in the context of the arguments you are presenting.
5. Avoid writing essays on subjects unless you have something to say that is interesting, if only to you. Too many candidates choose to write on questions of general importance (the population explosion, pollution, etc.) in the mistaken view that worthy sentiments are an adequate substitute for science.
6. Do not limit your answers to the content of particular lectures you have received. The examiners want to know if your reading has been wide and deep, if you can relate material from different parts of your course, if you can teach them something they didn't know, or suggest a good problem that they have not thought of themselves.
7. Questions can always be well answered in much less time than is allotted to them. Spend some time on thought in planning your answer. A brief but cogent answer wins every time against a rambling recital, however long.
8. Examiners try not to be prejudiced against answers that are almost illegible, or are in other ways hard to understand. But they are only human and it is kinder not to expose their weaknesses.
9. It is wrong to suppose that examiners resent the expression of unorthodox views or, what is not necessarily the same thing, views with which they disagree. Or, if they do resent it, that it influences their assessment. But it is only common sense to realise that the credit you may justly earn for independence of mind will be squandered if your assertion that the earth is flat is not supported by telling arguments.

10. If you feel the need to deceive the examiners, or to pull the wool over their eyes, you are probably not clever enough to succeed. A frankly inadequate answer deserves some marks, but if padded out with wild guesses, irrelevant matter, or repetition, it loses all claims to consideration.
11. Perhaps the single most foolish thing that candidates can do is to take drugs (whether tranquillisers or stimulants) in the hope of improving their performance. Only take drugs of any kind on medical advice. Advice given by friends who are nurses or medical students is not medical advice.
12. If you are unwell at examination time, consult a doctor. If he or she thinks that your performance will be affected by your condition, see that the examiners are told at once. A medical certificate must be produced if, for reasons of health, a candidate is absent from all or part of an examination.

## Appendix 3 MSc Project Web Pages – Marking Sheet

**STUDENT:**

**YEAR:**

**MARKER:**

### Instructions given to students (reproduced from Course Description):

“A part of the overall dissertation assessment is the creation of web pages describing the highlights of your work, aimed at an educated non-specialist audience. If your work produces results best shown as animations, etc, this can be a useful addition to the dissertation. This is also a useful exercise in a different form of communication, where you need to be succinct and to explain the essence of your work simply. All files for the web pages should be put in a sub-directory of the location for your electronic submission, and should be linked relative to the sub-directory holding the top page: i.e., if all files are then copied elsewhere, all the links still work.

“The assessment of the web pages will be by the same examiners who read your dissertation. They will judge whether you have designed a successful summary of your work, and have used this alternative means of communication successfully.”

### Marking scheme

Under each criterion, circle the grade that applied in your judgement. A = Excellent, >70%. B = Very good (60-69%). C = Good (50-59%). D = Satisfactory (40-49%). E = Fail (<39%). MSc-standard work is at least Good. Note that the scientific work underlying the pages is not to be judged again here (having been assessed in the mark for the project dissertation.)

Functionality of web pages (working links, etc)

A      B      C      D      E

Visual appearance (legibility, effective layout, attractive design, well-sized figures, etc)

A      B      C      D      E

Structure and exploitation of web possibilities (good use of links for non-linear reading, sensible progression of links, animations and applets, etc)

A      B      C      D      E

Written content (clear simple scientific explanations? pitched at the appropriate level?)

A      B      C      D      E

Overall summary mark:

Any comments / justification:

## Appendix 4 University of Edinburgh – Own Work Declaration

*This sheet must be filled in (each box ticked to show that the condition has been met), signed and dated, and included with all assessments - work will not be marked unless this is done*

*This sheet will be removed from the assessment before marking*

**Name:** ..... **Number:** .....

Course/Programme: .....

**Title of work:** .....

*I confirm that all this work is my own except where indicated, and that I have:*

- Clearly referenced/listed all sources as appropriate
- Referenced and put in inverted commas all quoted text (from books, web, etc)
- Given the sources of all pictures, data etc. that are not my own
- Not made any use of the report(s) or essay(s) of any other student(s) either past or present
- Not sought or used the help of any external professional agencies for the work
- Acknowledged in appropriate places any help that I have received from others (e.g. fellow students, technicians, statisticians, external sources)
- Complied with any other plagiarism criteria specified in the Course handbook

I understand that any false claim for this work will be penalised in accordance with the University regulations

**Signature** .....

**Date** .....

**Please note:** If you need further guidance on plagiarism, you can

1. Consult your course book
2. Speak to your course organiser or supervisor
3. Check out <http://www.aaps.ed.ac.uk/regulations/Plagiarism/Intro.htm>

*Please read the notes about the use of plagiarism detection software overleaf.*

## Use of plagiarism detection software

Note that computers may be used to detect plagiarism, whether by using something as simple as a search engine such as Google (it is as easy for a marker to find online sources as it is for you) or something more complex for specialized comparisons of work. Some courses will use the JISC plagiarism detection service.

The plagiarism detection service is an online service hosted at [www.submit.ac.uk](http://www.submit.ac.uk) that enables institutions and staff to carry out electronic comparison of students' work against electronic sources including other students' work. The service is managed by The University of Northumbria on behalf of the Joint Information Systems Committee (JISC) and is available to all UK tertiary education institutions by subscription.

The plagiarism detection service works by executing searches of the world wide web and extensive databases of reference material, as well as content previously submitted by other users. Each new submission is compared with all the existing information. The software makes no decisions as to whether a student has plagiarised, it simply highlights sections of text that are duplicated in other sources. All work will continue to be reviewed by the course tutor. As such, the software is simply used as a tool to highlight any instance where there is a possible case of plagiarism. Passages copied directly or very closely from existing sources will be identified by the software, and both the original and the potential copy will be displayed for the tutor to view. Where any direct quotations are relevant and appropriately referenced, the course tutor will be able to see this and will continue to consider the next highlighted case.

Once work has been submitted to the system it becomes part of the ever growing database of material against which subsequent submissions are checked. The copyright in each work submitted remains with the original author, but a non-exclusive, non-transferable, licence is granted to permit use of the material for plagiarism detection purposes.

There is an on-line demonstration of the system available at

<http://www.submit.ac.uk/>