MMet Meteorology with a year in Oklahoma UCAS code F863
For students entering Part 1 in 2006

Awarding Institution	The University of Reading
Teaching Institution	The University of Reading and the University of Oklahoma (year 3)
Relevant QAA subject benchmarking group:	ES3
Faculty of Science	Programme length: 4 years

Date of specification: 31/08/2007
Programme Director: Dr D.I.F.Grimes
Programme Adviser: Dr D.I.F.Grimes

Accreditation The programme outlined here is approved by the Royal Meteorological Society as an appropriate academic training for meteorologists seeking the qualification *Chartered Meteorologist*.

Programme aims
The programme aims to provide a thorough degree-level education in environmental physical science, with emphasis on the physics of the Earth's atmosphere and oceans. It also aims to provide graduates with a sufficient degree level knowledge of applied physics and mathematics to enable them to pursue a career outside the specialist areas of meteorology and oceanography. (For a full statement of the programme aims and outcomes see below.)

Transferable skills

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills that all students are expected to have developed by the end of their degree programme. In following this programme, students will have had the opportunity to enhance their skills relating to career management, communication (both written and oral), information handling, numeracy, problem solving, team working and use of information technology.

As part of this programme students are expected to have gained experience and show competence in the following transferable skills: IT (word-processing, using spreadsheet and graphical applications programs, scientific programming, internet), scientific writing, oral presentation, experimental methods (laboratory and field), team-working, use of library resources, career planning and management, and business awareness.

Programme structure
The profile that follows states which modules must be taken (the compulsory part), together with one or more lists of modules from which the student must make a selection (the 'selected' modules). Students must choose such additional modules as they wish, in consultation with the Director of Studies, to make 120 credits in each Part. The number of module credits for each module is shown after its title.

Part 1 (three terms)

Compulsory Modules		***Credits***	***Level***
MT11A	*Introduction to Atmospheric Science*	20	C
MT11B	*Weather Systems Analysis*	20	C
MT12C	*Skills for Environmental Science*	20	C
MA11B	*Calculus and Applications*	20	C
MA11C	*Matrices, Vectors and Applications*	20	C

Optional Modules (select 20 credits)

MA11A	*Introduction to Analysis*	20	C
PH1007	*Classical Physics & Great Ideas in Physics*	20	C
GO1D1	*Earth Structure and materials*	10	C
SS1A2	*Introduction to Soil Science*	10	C

Part 2 (three terms)

Compulsory Modules

MT23E	*Surface Energy Exchange*	10	I
MT24A	*Atmosphere and Ocean Dynamics*	20	I
MT24B	*Atmospheric Physics*	20	I
MT24C	*Numerical Methods for Environmental Sci.*	10	I
MT25D	*Skills for Graduates*	10	I
MT26F	*Atmospheric Analogues*	10	I
MA24L	*Differential equations & Fourier Series*	20	I

Optional Modules subject to pre-requisites stated in the Module descriptions

Students must select one or more Level I modules to the value of 20 credits in subject areas other than meteorology, subject to pre-requisites in some cases. Alternatively, the student may select a Level C module (for 20 credits) in a foreign language offered by the Institute Wide Language Programme (IWLP)

GO2L4	*Sedimentology & paleoclimate analysis*	10	I
GO2M5	*Global Change through Geological Time*	10	I
MA24A	*Analysis*	20	I
SS2D4	*Soils and soil development*	10	I
IWLP	*Practical French/German/Italian/Spanish*	20	C

Part 3 (two semesters)

Students must select four modules in each of the two semesters (an Independent Study module is also available in each semester. Note that the range of modules available varies a little from year to year)

Fall Semester (August to December)

MT3OK4133	*Atmospheric dynamics II*	15	H
MT3OK4424	*Synoptic Meteorology*	15	H
MT3OK4913	*Senior Seminar*	15	H

MT3OK5113	*Advanced atmospheric dynamics I*	15	H
MT3OK5233	*Cloud physics*	15	H
MT3OK5243	*Atmospheric electrodynamics*	15	H
MT3OK5491	*Weather forecasting*	15	H

Spring Semester (January to May)

MT3OK4433	*Mesoscale Meteorology*	15	H
MT3OK4990	*Radar Meteorology*	15	H
MT3OK4903	*Weather forecasting*	15	H
MT3OK5413	*Advanced synoptic Meteorology*	15	H
MT3OK5503	*Climate dynamics*	15	H
MT3OK5491	*Weather briefing*	15	H
MT3OK5803	*Mesoscale modelling*	15	H

Part 4 (three terms)

Compulsory Modules		***Credits***	***Level***
MT49E	*Boundary Layer Meteorology*	20	M

(Note, the practical component of this module is taken in the last 3 weeks of term 6 (i.e. BEFORE moving to Oklahoma)

MT4XA	*Part 4 Project*	30	M
MT4XB	*General Studies*	10	M

Optional Modules (select 60 credits from the following list)

Autumn term

MT4XF	*Oceanography*	10	M
MT4XH	*Atmospheric Science Field Course (Arran)*	10	M
MTMA39	*Forecasting Systems and Applications*	10	M

Spring Term

MTMW20	*Global Circulation*	10	M
MTMG16	*Climate Change*	10	M
MTMW14	*Num Modelling of Atmosphere and Oceans*	10	M
MTMW15	*Extratropical Weather Systems*	10	M
MTMG38	*Remote Sensing*	10	M
MTMA40	*Vegetation, Agriculture and the Atmosphere*	10	M
MTMB10	*Theory and Techniques of Data Assimilation*	10	M
MTMG19	*Tropical Weather Systems*	10	M

Progression requirements

To gain a threshold performance at Part 1 a student shall normally be required to achieve an overall average of at least 40% over 120 credits taken in Part 1, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 1 to Part 2, a student shall normally be required to achieve a threshold performance at Part 1 and additionally obtain at least 40% in the

Meteorology modules averaged together and not less than 30% in each of the modules MT11A, MT11B and MT12C.

To gain a threshold performance at Part 2, a student shall normally be required to achieve: an overall average of 50% over 120 credits taken in Part 2, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 2 to Part 3, a student shall normally be required to achieve a threshold performance at Part 2.

The same Part 2 to Part 3 threshold condition applies for progression from Part 3 in Oklahoma to Part 4 in Reading.

Programme teaching and assessment

Teaching is organised in modules that typically involve lectures, problem solving classes, and practical classes. The assessment is carried out within the University's degree classification scheme, details of which are in this handbook. The pass mark in each module is 40%. Parts 1 and 2 are assessed by a mixture of coursework and formal examination. In Part 3 at the University of Oklahoma, the modules are assessed either by a mixture of coursework and examination or by tests/examination only. The Part 4 project involves a substantial component of independent learning, under the supervision and guidance of a Project Supervisor. The project is assessed on the basis of formal reports, oral presentations and development of independent learning skills.

The weighting of the programme's components is Part 2 (20%) and 40% for each of Parts 3 and 4.

Please note that the University reserves the right to retain samples of coursework for the purposes of internal and external programme review.

You will be required to undertake a substantial independent piece of work (MT4XA) during Part 4 that will involve settling on a topic and supervisor after your return from Oklahoma. Notes of guidance on the preparation and submission of such a dissertation will be given to you by the Undergraduate Programme Director for Meteorology. You will also have an introductory lecture at the start of the Autumn Term about how to go about tackling the work.

Your Programme Handbook offers general advice (below) relevant to your subject. If you have any queries or require further information, you should consult the relevant lecturers or your tutor.

Admission requirements

Entrants to this programme are normally required to have obtained:

- Grade C or better in English, science and mathematics in GCSE or equivalent
- *Either* A/AS Level: 340 points overall including an AA combination in physics and mathematics (both A2 levels) and 100 points from another A level or other AS levels;

- *or* International Baccalaureat: 34 points including 7 in Physics and 7 in Mathematics;
- *or* Scottish Advanced Highers: 340 points with an AA combination in physics and mathematics plus the remainder from another Advanced Higher or other Highers;
- *or* Irish Leaving Certificate: three grade As and two grade Bs including physics and mathematics both at grade A

Admissions Tutor: David Grimes (Meteorology)

Support for students and their learning

University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Student Access to Independent Learning (S@IL) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

Within the providing Departments additional support is given through practical classes and problem solving classes. The Department of Meteorology Library holds all textbooks used in connection with the programme, and also contains a Learning Resource Centre containing additional material such as course notes, reprints of important papers, and past examination papers. There is a Course Adviser to offer advice on the choice of modules within the programme. Students also discuss their modules and more general teaching & learning matters regularly during their termly PAR with their tutor.

Career prospects

Graduates gaining a good honours degree are suitably qualified for graduate entry into the Met Office, where they may pursue a career in either operational meteorology or research. The British Antarctic Survey, the Centre for Ecology and Hydrology and the Environment Agency are examples of agencies providing employment to graduates wishing to specialise in the applications of meteorology. Opportunities a also exist in the general area of environmental consultancy, both with local authorities (in the UK) and private companies. However, a graduate is also qualified to follow a career involving more general applications of physical science and mathematics, as in teaching (primary or secondary level), the scientific civil service, and industry.

Study Abroad

The four-year MMet programme naturally involves a year of study in Oklahoma.

Educational aims of the programme

The programme aims to provide a thorough degree-level education in environmental physical science, with emphasis on the physics of the Earth's atmosphere and oceans. It also aims to provide graduates with a sufficient degree level knowledge of applied physics and mathematics to enable them to pursue a career outside the specialist areas of meteorology and oceanography.

Programme outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

A. Knowledge and understanding of:

1. The application of physical and mathematical methods to the description, modelling and prediction of physical phenomena in the atmosphere and oceans
2. More specialist topics relating to the Earth's climate system of current research interest
3. Impacts of weather, climate and climate change on society and ecology.

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Teaching/learning methods and strategies

The knowledge required for the basic topics is delineated in formal lectures supported by problem sets for students to tackle on their own.

The knowledge required for more specialist topics is enhanced through self-learning based on guided reading, problem solving and project work.

The knowledge required for 3 is gained from weekly discussion classes during part 3.

Feedback on most of 1 and 2 is provided through formative assessed work.

Assessment

Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertation and oral presentation also contribute.

B. Intellectual skills – the ability to:

1. Recognise and use subject-specific theories, paradigms, concepts and principles
2. Analyse, synthesise and summarise information critically
3. Apply knowledge and understanding to address familiar and unfamiliar problems
4. Collect and integrate evidence to formulate and test hypotheses
5. Identify and understand moral and ethical issues relating to the subject area

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Teaching/learning methods and strategies

Most modules are designed to develop 1 and 2. 1, 2 and 3 are enhanced through the use of coursework assignments, fieldwork and project work. 4 is enhanced mainly by project work. 5 is addressed in discussion classes.

Assessment

1-3 are assessed indirectly in most parts of the programme. 4 is assessed in the part 3 project. 5 is assessed by a General Paper.

Skills and other attributes

C. Practical skills

1. Planning, conducting, and reporting on investigations, including the use of secondary data
2. Collecting, recording and analysing data using appropriate techniques in the field and laboratory
3. Undertake field and laboratory investigations in a responsible and safe manner
4. Referencing work in an appropriate manner

Teaching/learning methods and strategies

Laboratory, IT, and field classes are designed to enhance skills 1 and 2. 3 is emphasised through guidelines and advice given to students in connection with practical work.
4. is emphasised through guidelines issued to students in connection with project work.

Assessment

1 and 2 are tested formatively in coursework connected with laboratory and field classes. 3 is not assessed. 4 is assessed as part of the part 3 project report.

D. Transferable skills

1. Communication: the ability to communicate knowledge effectively through written and oral presentations.
2. Numeracy and C & IT: appreciating issues relating to the selection and reliability of field and laboratory data; preparing, processing, interpreting and presenting data; solving numerical problems using computer and non-computer based techniques; using the Internet critically as a source of information.
3. Interpersonal skills: ability to work with others as a team , share knowledge effectively; recognise and respect the views and opinions of other team members.
4. Self management and professional development: study skills, independent learning, time management, identifying and working towards targets for personal, academic and career development
5. Library skills: the effective use of library resources.

Teaching/learning methods and strategies

Skills listed under 1 and 2 are developed throughout most of the programme, but especially through practical work, field classes and project work. 3 is encouraged through team-working within laboratory and field classes. 4 is enhanced partly through the provision of a Career Development Skills module during part 2, and partly through a PAR tutorial system. 5 is covered by a study skills module.

Assessment

1 is assessed directly as an outcome of project work, and contributes to the assessment of practical work. 2 is assessed indirectly, mainly in connection with laboratory and field classes. Skills in 3, 4 and 5 are also assessed and their effective use will enhance performance in H level modules.

Please note - This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance processes or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.