

BSc Meteorology with a year In Oklahoma

UCAS code: F862

Awarding Institution	The University of Reading
Teaching Institution	The University of Reading (and Oklahoma)
Relevant QAA subject benchmarking group:	ES3
Faculty of Science	Programme length: 4 years
For students entering Part 1 in 2004	Date of specification: 03/04/2004
Programme Director: Dr E J Highwood (Meteorology)	
Programme Adviser: Dr E J Highwood (Meteorology)	

Board of Studies: Single and Combined Subject Degrees in Meteorology

Accreditation: Approved by the Royal Meteorological Society as an appropriate academic training for meteorologists seeking the qualification *Chartered Meteorologist*.

Summary of 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 content

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 their programme adviser, to make 120 credits in each Part. The number of module credits for each module is shown after its title.

Part 1 (three terms)

<i>Compulsory Modules</i>		<i>Credits</i>	<i>Level</i>
MT11A	<i>Introduction to Atmospheric Science</i>	20	C
MT11B	<i>Weather Systems Analysis</i>	20	C
MT12C	<i>Skills for Environmental Science</i>	20	C

Optional Modules (must include at least 20 credits selected from modules marked #)

MA111	# Mathematics for Scientists	20	C
PH1003	# Mathematical Physics & Problem Solving	20	C
MA11A	# Introduction to Analysis	20	C
MA11B	# Calculus and Applications	20	C
MA11C	# Matrices, Vectors and Applications	20	C
PH1001	Concepts in Physics	20	C
PH1002	Classical Physics	20	C
GO1A1	Earth Structure and Processes	10	C
GO1B1	Earth Materials	10	C
GO1C2	Earth History and Evolution	10	C
SS1A1	Introduction to Soil Science	10	C
SS1A2	Soils, Land and Environment	10	C
SS1B2	Soil Processes and Applications	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
MA240	Mathematical Methods and Models	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. Alternatively, the student may select a Level C module (for 20 credits) in a foreign language offered by the Institute Wide Language Programme (IWLP)

GO2F4	Geophysics	10	I
GO2D5	Quaternary & modern Geology	10	I
MA24A	Analysis	20	I
PH2001	Thermal Physics	20	I
PH2003	Electromagnetism	20	I
SS2D4	Soils and soil development	10	I
SS2C5	Soils and environmental pollution	10	I
IWLP	Practical French/German/Italian/Spanish	20	C (terms 4 & 5)

Part 3 (three terms)

Compulsory Modules

		<i>Credits</i>	<i>Level</i>
MT36E	Boundary Layer Meteorology	20	H
MT37A	Part 3 Project	30	H
MT37B	General Studies	10	I

Optional Modules (Students must select 60 credits)

MT37C	Data Analysis methods in Weather and Climate Research	10	H
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MT37D	<i>Remote Sensing Methods and Applications</i>	10	H
MT37E	<i>Dynamics of Weather Systems</i>	10	H
MT37F	<i>Oceanography</i>	10	H
MT38A	<i>The Global Circulation</i>	10	H
MT38B	<i>Climate Change</i>	10	H
MT38C	<i>Numerical Weather Prediction</i>	10	H
MT38D	<i>Advanced Weather Systems Analysis</i>	10	H

Part 4 (two semesters)

Students must select four modules in each of the two semesters (note that this list is only indicative. The modules available will vary slightly from year to year)

Fall Semester (August to December)

Metr4424	<i>Synoptic Meteorology Laboratory</i>	15	H
Metr4911	<i>Senior Seminar (Part 1)</i>	15	H
Metr5113	<i>Advanced Atmospheric Dynamics I</i>	15	H
Metr5223	<i>Cloud Physics</i>	15	H
Metr5243	<i>Atmospheric Electrodynamics</i>	15	H
Metr5303	<i>Objective analysis/data assimilation</i>	15	H
Metr5491	<i>Weather Briefing</i>	15	H
Metr6223	<i>Convective clouds & storms</i>	15	H
Metr6413	<i>Advanced mesoscale meteorology</i>	15	H

Spring Semester (January to May)

Metr4433	<i>Mesoscale Meteorology</i>	15	H
Metr4803	<i>Weather forecasting</i>	15	H
Metr4913	<i>Senior Seminar</i>	15	H
Metr5413	<i>Advanced Synoptic Meteorology</i>	15	H
Metr5503	<i>Climate Dynamics</i>	15	H
Metr5613	<i>Radar Meteorology</i>	15	H
Metr5803-001	<i>Mesoscale Modelling</i>	15	H
Metr5803-002	<i>Dynamic Data Assimilation</i>	15	H
Metr6950	<i>Weather Briefing</i>	15	H

Progression requirements

To proceed to Part 2 it is sufficient to obtain an average of at least 40% overall and at least 40% in the Meteorology modules averaged together and not less than 30% in each of these modules (MT11A, MT11B and MT12C). In addition students must achieve a mark of at least 30% in individual modules amounting to not less than 100 credits.

To proceed to Part 3 it is sufficient to obtain an average of at least 40% overall, and achieve a mark of at least 30% in individual modules amounting to not less than 100 credits. The same conditions apply for progression from Part 3 to Part 4 in Oklahoma.

Summary of 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 the programme handbooks. The pass mark in each module is 40%. Part 1 and 2 are assessed by a mixture of coursework and formal examination. In Part 3 there are

some modules which are assessed wholly by coursework and others wholly by examination: the details are given in the module descriptions. The Part 3 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.

Part 2 contributes one third of the overall assessment and Part 3 the remaining two thirds. For the F862 (Oklahoma) programme, Part 2 comprises 20% of the overall assessment with Parts 3 and 4 each contributing 40%.

Admission requirements (F958)

This programme is intended for mature and younger students who either do not satisfy the normal entry requirements for the 3-year programme or recognise the need to revise the prerequisite areas of science and mathematics in preparation for Part 1 of the 3-year programme.

Applicants should possess mathematical skills and a basic science background appropriate to GCSE levels or near equivalent in these two subject areas. Each candidate will be considered on an individual basis, and persons wishing to apply for a place on this programme are strongly urged to discuss their needs with the Admissions Tutor before making a formal application.

Admission requirements (F862)

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 A 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 Highers: three grade As and two grade Bs including physics and mathematics both at grade A

Admissions Tutor: Mr Ross Reynolds (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.

Career prospects

Graduates gaining a good honours degree are suitably qualified for graduate entry into the Meteorological 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 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.

Opportunities for study abroad

4-year Meteorology programme, which includes one year of advanced study at the University of Oklahoma, USA.

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.

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.

Skills and other attribute

<p>B. Intellectual skills – the ability to:</p> <ol style="list-style-type: none"> 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 	<p>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.</p> <p><i>Assessment</i> 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.</p>
<p>C. Practical skills</p> <ol style="list-style-type: none"> 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 	<p>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.</p> <p><i>Assessment</i> 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.</p>
<p>D. Transferable skills</p> <ol style="list-style-type: none"> 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. 	<p>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.</p> <p><i>Assessment</i> 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.</p>

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 expect 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 programme handbooks.

