

## **MSc in Applied Meteorology and Climate with Management**

### **For students entering in 2013/4**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	
Faculty:	Science Faculty
Programme length:	12 months
Date of specification:	08/Oct/2013
Programme Director:	Dr Andrew Charlton-Perez
Programme Advisor:	
Board of Studies:	School of MPS PG taught programmes
Accreditation:	The programme is approved by the Royal Meteorological Society as appropriate training for meteorologists seeking the qualification <i>Chartered Meteorologist</i> .

### **Summary of programme aims**

The aim of the Applied Meteorology and Climate with Management MSc programme is to provide the scientific background for improved understanding of the broad aspects of meteorology but also of current and in particular future climate. A special emphasis is laid on developing skills in both interpreting and communicating regional climate prediction products and in the management of people and organisations.

### **Transferable skills**

The following transferable skills should be gained by students during this degree programme:

- Presentation Skills (written and oral)
- Design of research project
- Word-processing
- Writing technical reports
- Team working
- Solving numerical problems relating to environmental science
- Reviewing and synthesizing information in a special field of interest
- Practical measurement skills
- Applications to standard software packages (spreadsheets, databases, image analysis) to environmental science
- Accessing academic and technical information via library and online facilities
- People and organisation management
- Interpreting and communicating complex information to non-specialists

### **Programme content**

The modules offered as part of the taught part of the programme are listed below:

#### *Compulsory modules:*

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
MMM048	Managing People and Organisations	20	7
MTMG05	Professional Skills	10	7
MTMG34	Experiencing the Weather	10	7
MTMA33	Introduction to Computing	10	7
MTMA39	Forecasting Systems and Applications	10	7
MTMG02	Atmospheric Physics	10	7
MTMG04	Weather and Climate Discussion	0	7
MTMG99*	Dissertation	60	7

In addition, students will undertake a Met Office PRECIS Training Week during the Summer Term.

\*Students following the Postgraduate Diploma may take a 30-credit extended essay module in place of the MSc dissertation.

#### *Optional modules:*

MTMG16	Climate Change	10	7
MTMG19	Tropical Weather Systems	10	7
MTMG21	Oceanography	10	7
MTMG25	Hazardous Weather Analysis	10	7

MTMG06	Statistics for Weather and Climate Science	10	7
MTMG44	Hydrology & Global Environmental Change	10	7
MTMD01	Environmental Data Exploration	10	7
APME69	Climate Change Policy & governance	10	7
MMM018	Leadership & Advanced Business Policy	20	7

### **Specification for MSc**

Students must complete all compulsory modules (130 credits) and choose four optional modules (50 credits) taught during the Spring Term. The 60-credit dissertation must be completed by mid-August.

Total credit value of MSc: 180

### **Specification for Postgraduate Diploma**

Students must complete all compulsory modules (excluding the dissertation) (70 credits), and must choose one of the following two routes:

EITHER:

Students must choose four optional modules (40 credits) taught during the Spring Term;

OR:

Students must choose one optional module (10 credits) taught during the Spring Term, and complete an extended essay worth 30 credits by the end of June.

Total credit value of Postgraduate Diploma: 120

### **Specification for Postgraduate Certificate**

Students must complete modules to the value of 60 credits from the compulsory and / or optional module lists above, excluding the dissertation.

Total credit value of Postgraduate Certificate: 60

All module selections are subject to the agreement of the Programme Director.

### **Part-time or modular arrangements**

Students who wish to do the MSc programme part time over two years should contact the Programme Director to discuss details. The Team Project and Forecasting Course (MTMG05 Parts (2) and (3)) can be undertaken in either year.

### **Progression requirements**

### **Summary of Teaching and Assessment**

The programme is in four major sections.

1. The Autumn term provides a broad introduction to the science of meteorology and the techniques of managing individuals and organisations. No prior knowledge of the subject is assumed, but it is expected that students are familiar with the relevant mathematics and physics. Autumn term modules are assessed partly by coursework (including laboratory reports) and partly by examinations normally early in the New Year. The sixth week of term is free of teaching, except for the management module

2. More advanced and specialised modules are presented in the Spring Term. The modules are assessed partly by coursework and partly by examination during the Easter Vacation.

An additional component in the Spring Term is the *Team Project* (MTMG05), undertaken by students working together in small groups. Week 6 during the term is devoted to researching and presenting this project. Assessment is based on a written report and an oral presentation.

3. The MTMG05 (Forecasting Course) usually takes place early in the Summer Term. This involves trainers from the UK Met Office running a four-day session using their forecasting scheme in the Department.

4. From this point on, almost all student time is spent (for MSc students) in preparing a dissertation on a selected topic that must be completed by mid-August or, for Diploma students, in preparing an extended essay on a selected topic that must be completed by the end of June. In both cases, the student chooses the topic in consultation with members of staff.

The MSc dissertation must contain a substantial review of current and recent research in the chosen field and will usually also contain some original research in the form of experimental work and/or data analysis for

example. The inclusion of a management aspect to the dissertation is a possibility. Students will be asked to give a brief oral, non-assessed, presentation on their progress around the end of the summer term.

The Diploma essay will normally be a literature review.

Throughout the year, students are encouraged to attend departmental seminars and are expected to attend the Weather and Climate Discussion (MTMG04) held weekly in term time. The Spring term Professional Skills module (MTMG05) includes a series of career-related presentations and visits to relevant potential employer institutions including the UK Met Office HQ. While these activities are not examined, they are an important component of the student's education. They contribute to their general understanding and to possible choices of dissertation topic and career.

Much of the teaching on the Applied Meteorology and Climate with Management programme is in common with the MSc programme in Applied Meteorology. First year PhD students and Met Office staff undergoing training also attend many of the modules so class sizes may be as high as 50 in the Autumn Term when all modules are core. In the Spring term, when students choose from a range of options, class size is typically 10 to 20.

### **Programme classification**

The University's taught postgraduate marks classification is as follows:

Mark	Interpretation
70-100%	Distinction
60 - 69%	Merit
50 - 59%	Good standard (Pass)
40 - 49%	Work below threshold standard (Fail)
0 - 39%	Unsatisfactory Work (Fail)

### **For Masters Degrees\*\***

**Distinction:** A weighted average mark of 70 or more over 180 credits

AND

a mark of 60 or more for the dissertation

AND

no mark below 40.

**Merit:** A weighted average mark of 60 - 69 over 180 credits

AND

a mark of 50 or more for the dissertation

AND

no mark below 40.

**Pass:** A weighted average mark of 50 - 59 over 180 credits

AND

a mark of 50 or more for the dissertation

AND

no significant weakness (i.e. no mark below 40 in modules agreed at validation to be of special significance to the programme)

AND

no absolute weakness (ie the total credit value summed for all modules marked below 40 does not exceed 30 credits and for all modules marked below 50 does not exceed 55 credits).]

**Fail:** A performance that fails to fulfil the criteria for the above classifications.

### **Postgraduate Diploma**

A diploma is awarded on successful completion of 120 module credits.

**Distinction:** A weighted average mark of 70 or more over 120 credits

AND

no mark below 40.

**Merit:** A weighted average mark of 60 - 69 over 120 credits

AND  
no mark below 40.

**Pass:** A weighted average mark of 50 - 59 over 120 credits

AND  
no significant weakness (ie no mark below 40 in modules agreed at validation to be of special significance to the programme)

AND  
no absolute weakness (ie the total credit value summed for all modules marked below 40 does not exceed 30 credits and for all modules marked below 50 does not exceed 55 credits).]

**Fail:** A performance which fails to fulfil the criteria for the above classifications.

### **Postgraduate Certificate**

A certificate is awarded on successful completion of 60 module credits.

Students must complete all assessed modules (60 credits) in the Autumn term. To pass the Postgraduate Certificate students must gain an average mark of 50 or more. In addition the total credit value of all modules marked below 40 must not exceed 10 credits.

Oral examination of a small selection of candidates may be held at the Examiners' Meeting in mid-September. During the oral examination, candidates are expected to show an understanding both of the background to their dissertation, and of the general course work. Any such interviews are normally used to gauge the quality of Reading MSc candidates compared to those offered in other institutions. They are not normally used to affect the overall result.

### **Admission requirements**

Entrants to this programme are normally required to have obtained a good honours degree in mathematics or a physical, environmental or engineering science. 'A' level physics and/or mathematics (or equivalent) are usually required. This programme is normally limited to candidates from overseas weather services who are sponsored by the World Meteorological Organisation or the UK Met Office.

Candidates whose native language is not English must meet the University of Reading's minimum requirements for English proficiency.

**Admissions Tutor:** Professor Daniel Feltham

### **Support for students and their learning**

University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, the Careers, Placement and Experience Centre (CPEC), In-sessional English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and 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, School Senior Tutors, the Students' Union, the Medical Practice and advisers in the Student Services Centre. The Student Services Centre is housed in the Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing, academic issues (eg problems with module selection) and exam related queries. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see [www.reading.ac.uk/student](http://www.reading.ac.uk/student)

The Department of Meteorology provides modern laboratory facilities and an atmospheric observatory for teaching purposes. In addition to the central University facilities, the Department has its own PC labs for teaching and student use and a professionally staffed library with copies of all recommended texts and runs of major meteorological periodicals. The Meteorology Department library houses a learning resource centre and adjacent to the library is a purpose-designed student study area.

Learning support is provided by a tutor system and optional class tutorials given with some modules. Each student is assigned a tutor at the start of the programme. Tutorial groups normally consist of three or four students. Weekly tutorials are compulsory during the Autumn term and thereafter may be continued if desired

by mutual agreement between tutor and tutees. For team projects and the dissertation, guidance is given by a project supervisor.

A self-teaching package is available for those students who need remedial support with Maths and Physics. This package is also provided as a pre-course 'warm-up' for those students who need to improve their Maths and Physics skills before the start of the programme in October and acts as a diagnostic tool for the admissions tutor.

### **Career prospects**

The other Meteorology MScs have an excellent record in placing graduates in relevant employment. Over 80% of those graduating over the last 5 to 6 years are working in meteorology or related disciplines, including those who have returned to their home weather services, those training at the UK Met Office as forecasters and a group who have progressed to PhDs. The management and PRECIS training on this new MSc programme will enhance the status of its graduates, improve their prospects for career progression and benefit both their weather service and nation.

### **Opportunities for study abroad or for placements**

Dissertation projects for other programmes over the last few years have been successfully arranged in collaboration with a number of organisations including the Met Office, Willis, Hiscox Insurance, Electricite de France, ForestRe and BP.

### **Programme Outcomes**

#### **Knowledge and Understanding**

##### **A. Knowledge and understanding of:**

1. the physical processes which drive the atmospheric system giving rise to weather and climate;
2. the feedback between the Earth's surface and the atmosphere and the impact of these feedback processes on weather, climate and land surface characteristics;
3. methods of measurement and data analysis appropriate to monitoring atmospheric processes and an appreciation of the limitations and uncertainties of the measurements and data
4. impacts of weather, climate and climate change on society and ecology
5. advanced, specialist weather and climate topics.
6. Managing individuals & organisations.
7. How people behave in organisations and the practical implications for managers

##### **Teaching/learning methods and strategies**

Knowledge and understanding for items 1 to 6 is achieved through lectures, seminars, discussions and tutorials and computer laboratories. Lectures often include problem sheets and guided reading as additional material  
In addition, knowledge and understanding of measurement techniques (3) is gained through laboratory classes and a field course.  
In addition to taught modules, item 5 is achieved by independent reading and library searching for the dissertation and team project. Small group and whole class discussion (7)

##### *Assessment*

Knowledge is tested through written assignments, project reports and examinations as well as oral presentations

#### **Skills and other attributes**

##### **B. Intellectual skills - able to:**

1. apply knowledge and understanding gained to a variety of familiar and unfamiliar situations;
2. analyse data with a critical awareness of possible weaknesses and uncertainties
3. formulate and test hypotheses
4. show independence and initiative in approaches to problem solving
5. present conclusions clearly to expert and non-expert audiences in written and oral forms
6. critically review, synthesise and evaluate published research.

##### **Teaching/learning methods and strategies**

1, 2 3 and 4 are developed by a combination of problem sheets, worked examples, coursework assignments, computing classes project work and dissertation  
5 is addressed through lectures, tutorials and also through team project and dissertation reports and presentations.  
6 is covered in lectures and through the team project and dissertation.

##### *Assessment*

1 and 2 are assessed through coursework and exams  
3, 4 and 5 are mainly assessed through team project

and dissertation presentations and reports

### **C. Practical skills - able to:**

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
5. Management of individuals,
6. organisations (and organisational
7. change) and research project(s)
8. including applications.

### **D. Transferable skills - able to:**

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, personal responsibility and decision making in complex situations
5. Library skills: the effective use of library resources.

### **Teaching/learning methods and strategies**

Laboratory, IT, field work 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 and the field course. 4. is emphasised through guidelines issued to students in connection with project and dissertation work.

#### *Assessment*

1 and 2 are tested formatively in coursework connected with laboratory and field classes. 3 is not assessed. 4 is assessed in team project and dissertation

### **Teaching/learning methods and strategies**

Skill listed under 1 and 2 are developed throughout most of the programme, but especially through practical work, field course, team project and dissertation . 3 is encouraged through team-working within laboratory, field course and team project. 4 is encouraged throughout the programme and particularly in the team project and dissertation. 5 is covered by a study skills module and practiced in tutorials, team project and dissertation..

#### *Assessment*

1 is assessed through coursework, exams, project work and dissertation. 2 is assessed through laboratory, field course and computing modules and in the team project and dissertation.. 3 is indirectly assessed in the field course and team project. 4 and 5 are indirectly assessed in coursework assignments, team project and dissertation

**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 process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.**