

**MSc in Applied Meteorology and Climate with Management
For students entering in 2014/5**

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:	19/Sep/2014
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
- Teamworking
- Solving numerical problems related to environmental science
- Reviewing and synthesizing information in a specific field of interest
- Practical measurement skills
- Applications of 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.

Module Code	Module Title	Core/Option	Credit	Level
<i>Autumn Term</i>				
MMM048	Managing people and organisations	C	20	7
MTMG02	Atmospheric physics	C	10	
MTMG05	Professional skills 1 - basic weather analysis/forecasting	C		7
MTMA33	Introduction to computing	C	10	7
MTMG34	Experiencing the weather	C	10	7
MTMA39	Forecasting systems & applications	C	10	7
MTMG04	Weather & climate discussion	C		
<i>Spring Term</i>				
MMM018	Leadership & advanced business policy	O	20	7
MTMD01	Environmental Data Exploration	O	10	7
MTMG05	Professional skills 2 - team project	C		7
MTMG06	Statistics for weather & climate science	O	10	7
MTMG16	Climate Change	O	10	7

MTMG19	Tropical weather systems	O	10	7
MTMG25	Hazardous weather	O	10	7
MTMG38	Remote sensing	O	10	7
MTMG44	Hydrology & global environmental change	O	10	7
MTMG04	Weather & Climate Discussion	C		
Summer Term				
MTMG05	Professional skills 3 Met Office Forecasting course	C	10	7
MTMG04	Weather & Climate Discussion	C		
MTMG99	Dissertation (MSc), Essay (Diploma)	C	60(MSc)	7
	Met Office PRECIS training week	C	30 (Dip)	

Notes on module listing

1. Specification for MSc

Students must complete all compulsory modules (130 credits) plus modules in the Spring Term from those marked as optional (50 credits). A dissertation worth 60 credits must be completed by the middle of August.
Total credit value of MSc = 180.

2. Specification for Diploma

Students must complete all core taught modules (70 credits), then the following two routes are available:

EITHER:

Students must choose modules in the Spring Term to the value of 50 credits

OR

Students must choose one or more modules in the Spring Term worth a total of 20 credits and complete an extended essay worth 30 credits by the end of June.

Total credit value of Diploma = 120.

3. Specification for Certificate

Students must complete all assessed modules (60 credits) in the Autumn Term.

Total credit value of Certificate = 60.

Part-time or modular arrangements

This programme is not currently available part-time.

Progression requirements

Not applicable for MSc programme

Summary of Teaching and Assessment

The programme is in three major sections.

1. The Autumn term provides an introduction to the science of meteorology and of the management of individuals and organisations. No prior knowledge of the subjects is assumed, but it is expected that students are familiar with the relevant mathematics and physics for the meteorology modules. Autumn term modules are assessed partly by coursework (including a fieldwork report) and partly by examinations taken at the end of the Christmas vacation. The sixth week of term is free of teaching.
2. More advanced and specialised modules are presented in the Spring Term. The modules are assessed partly by coursework and partly by examination at the end of the Easter Vacation. The module MMM018 may

clash on the timetable with some meteorology modules. Students will take advice from the Programme Director. 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 third part of MTMG05 (Met Office Forecasting course) usually takes place early in the Summer Term.

There is an additional one week's training in the use of the UK Met Office's 'PRECIS' software which is used for generating regional climate prediction products. This training is provided by Met Office staff and is not assessed.

Most of the students on the Applied Meteorology and Climate with Management course are sponsored by the World Meteorological Organisation (WMO), and sponsorship includes payment of the Precis training fee. Attendance is compulsory for sponsored students.

Students who are not funded by the WMO will have to pay an additional fee to attend. However, please note that as the PRECIS training is not assessed, it would not affect a student's grade if they chose not to attend.

After the Easter exams, almost all student time is spent (for MSc students) in preparing a dissertation on a selected topic which must be completed by mid August or, for Diploma students, in preparing an extended essay on a selected topic which 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. 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 & Climate Discussion (MTMG04) held weekly in term time. The Professional Studies module (MTMG05) involves in part a series of seminars and visits to relevant institutions organised especially for MSc students who are expected to attend. 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 programme is in common with the other MSc programmes. First year PhD students and, occasionally, Met Office staff also attend 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:

<u>Mark</u>	<u>Interpretation</u>
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)*.

Failed 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.

Students must complete all compulsory modules (70 credits) and then either of the following two routes are possible:

- Students must complete FIVE optional modules in the Spring Term (50 credits)
- Students must choose TWO modules in the Spring Term from those marked optional (20 credits) and complete an extended essay of about 10,000 words on a topic chosen in consultation with a member of staff. The extended essay is worth 30 credits and must be submitted by the end of June.

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.

Passed: 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)*.

Failed 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 or a combination of modules from the Autumn and Spring Terms. 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*.

*Note: the provision to permit a candidate to be passed overall with a profile containing marks below 40 is made subject to the condition that there is evidence that the candidate has applied him or herself to the work of those modules with reasonable diligence and has not been absent from an examination, for example, without reasonable cause.

Oral examination of some or all the candidates may be held at the Examiners' Meeting in 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. These brief interviews are for the guidance of the External Examiner and do not normally count towards the overall result.

Admission requirements

Candidates must normally be employed by a less developed nation's meteorological service and offer a degree (at least a Lower Second Class Honours degree - or equivalent) usually in mathematics, physics or a related subject that contains a satisfactory proportion of mathematics and/or physics. Currently the great majority of candidates enter the MSc programme after winning support from the World Meteorological Organisation (WMO) in the form of a Fellowship. This however does not exclude other candidates. Candidates can discuss their background with the Admissions Tutor, Dr Tom Frame (t.h.a.frame@reading.ac.uk)

Candidates must note that in addition to the Department's offer of a place on the MSc, the Science Faculty Office makes the formal offer after checking that non-native speakers have met the University's minimum English language requirements (i.e. 6.5 overall on IELTS). Entry is completed once candidates who have satisfied the scientific and English requirements confirm their WMO sponsorship to the Science Faculty Office.

Admissions Tutor: Dr Tom Frame

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-session 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

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'/diagnostic indicator for those students who need to improve their Maths and Physics skills before the start of the programme at the end of September.

Career prospects

The other Meteorology MSc's have an excellent record in placing graduates in relevant employment. Over 80% of those graduating in 2011 and 2012 are working in meteorology or related disciplines, including those who have returned to their host 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 their nation.

Opportunities for study abroad or for placements

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. the interface between climate science/environmental issues and advising policy decision makers
7. the way in which individuals and organisations are managed effectively

Teaching/learning methods and strategies

Knowledge and understanding for items 1 to 5 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.

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. plan, cond, and report on investigations, including the use of secondary data
2. collect, record and analyse data using appropriate techniques in the field and laboratory
3. undertake field and laboratory investigations in a responsible and safe manner
4. reference work in an appropriate manner
5. develop practical expertise in managing staff and organisations

D. Transferable skills -able to:

1. Communicate: the ability to communicate knowledge effectively through written and oral presentations.
2. appreciate 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 - Numeracy and C & I
3. work with others as a team, share knowledge effectively; recognise and respect the views and opinions of other team members - Interpersonal skills.
4. manage personal and professional development: study skills, independent learning, time management, personal responsibility and decision making in complex situations
5. effectively use library resources - library skills.

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.

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, 5 in essays and group presentations

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.