

**MMet Meteorology and Climate with a Year in Oklahoma  
For students entering Part 1 in 2015/6**

**UCAS code: F791**

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	ES3
Faculty:	Science Faculty
Programme length:	4 years
Date of specification:	24/May/2016
Programme Director:	Dr Peter Inness
Programme Advisor:	Dr Tristan Quaife
Board of Studies:	School of Mathematical and Physical Sciences
Undergraduate	
Accreditation:	The programme outlined here is approved by the Royal Meteorological Society as an appropriate academic training for meteorologists seeking the qualification <i>Chartered Meteorologist</i>

**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.

**Transferable skills**

During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills. In following this programme, students will have had the opportunity to develop such skills, in particular relating to numeracy and problem solving, communication (both written and oral, including scientific writing), IT (word-processing, using spreadsheet and graphical applications programs, scientific programming, internet), experimental methods (laboratory and field), team-working, use of library resources, career planning and management, business awareness, interpersonal skills, learning skills, self-management, information handling and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.

**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 optional modules). Students must choose such additional modules as they wish, in consultation with the Programme Director, 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*

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
MT12C	Skills for Environmental Science	20	4
MT11C	Introduction to Meteorology	20	4
MT11D	Weather, Climate and Fundamentals	20	4
MA1CA	Calculus	20	4
MA1LA	Linear Algebra	20	4

*Optional modules (select 20 credits)*

PH101	Physics of the Natural World	20	4
PH102	Atomic and Nuclear Physics	10	4
PH103	Global Environmental Chemistry	10	4
GV1EI	Environmental Issues	10	4

**Part 2 (three terms)**

### Compulsory modules

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
MT24A	Atmosphere and Ocean Dynamics	20	5
MT24B	Atmospheric Physics	20	5
MT24C	Numerical Methods for Environmental Science	10	5
MT25D	Skills for Graduates	10	5
MA2ODE	Ordinary Differential Equations	10	5
MA2PDE	Partial Differential Equations	10	5
MT26E	Surface Energy Exchange	10	5
MT25F	Atmospheric Analogues	10	5

*Optional modules subject to pre-requisites stated in the Module descriptions.*

Students must select one or more Level 5 modules to the value of 20 credits, subject to pre-requisites in some cases. Alternatively, students may select a Level 4 module (for 20 credits) in a foreign language offered by the Institution Wide Language Programme (IWLP).

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
GV2M5	Quaternary Global Climate Change	10	5
MT24E*	Weather Forecasting	10	5
MT2SWC	Statistics for Weather and Climate Science	10	5
MT2ACT	Atmospheric Chemistry and Transport	10	5
LA1XX1	Institution Wide Language Programme	20	4

\* MT24E will have a limit of 16 students

*(University of Oklahoma)*

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. The modules listed here are an example set. You will be briefed on choosing modules in Oklahoma prior to your departure. Students should take eight modules in total and these should be made up of 3000 and 4000 level modules with no more than two 3000 level modules in total. All modules should be from the School of Meteorology. Students are encouraged to take 5000 level modules they find interesting however should note that these confer no additional credit back at UoR. Students are should not take 6000 level modules without previously discussing it with the MMet Coordinator or the Programme Director. Classes from outside Meteorology can be taken only after approval by the MMet Coordinator or the Programme Director. They should conform to the correct level (i.e. either be 4000 level or one of the two 3000 level modules) and, as a rule of thumb, from a science discipline relevant to climate or meteorology.

*Fall Semester (August to December)*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
MT3OK4133	Atmospheric Dynamics II	15	6
MT3OK4424	Synoptic Meteorology	15	6
MT3OK4913	Senior Seminar	15	6
MT3OK5113	Advanced Atmospheric Dynamics I	15	6
MT3OK5233	Cloud Physics	15	6
MT3OK5243	Atmospheric Electrodynamics	15	6
MT3OK5491	Weather Forecasting	15	6

*Spring Semester (January to May)*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
MT3OK4433	Mesoscale Meteorology	15	6
MT3OK4990	Radar Meteorology	15	6

MT3OK4903	Weather Forecasting	15	6
MT3OK5413	Advanced Synoptic Meteorology	15	6
ME3OK5503	Climate Dynamics	15	6
MT3OK5491	Weather Briefing	15	6
MT3OK5803	Mesoscale Modelling	15	6

#### **Part 4 (three terms)**

##### *Compulsory modules*

<i>Code</i>	<i>Module title</i>	<i>Credits</i>	<i>Level</i>
MT49E	Boundary Layer Meteorology	20	7
MT4XA	Part 4 Project	40	7
MT4XB	General Studies	10	7

*Optional modules (select 50 credits from the following list)*

##### *Autumn term*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
MT4XD	Remote Sensing Methods & Applications	10	7
MT4XG	Current Topics in Weather and Climate Research	10	7
MT4XF	Oceanography	10	7
MT4XH *	Atmospheric Science Field Course (Arran)	10	7
MA4DA	Theory and Techniques of Data Assimilation	10	7

\* MT4XH has a maximum class size of 16 people including those taking MT37H. You will be contacted to register your interest. If more than 16 people wish to take part, selection will be made by random draw.

##### *Spring Term*

<i>Code</i>	<i>Title</i>	<i>Credits</i>	<i>Level</i>
MT4YA	Global Circulation	10	7
MT4YB	Climate Change	10	7
MT4YC	Numerical Weather Prediction	10	7
MT4YD	Tropical Weather Systems	10	7
MT4YN	Atmospheric Electricity	10	7
MT4YF	Numerical Modelling of Atmosphere and Oceans	10	7
MT4YG	Extratropical Weather Systems	10	7

#### **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 MT11C, MT11D and MT12C

Transfer from BSc Meteorology and climate

This is awarded competitively with the highest graded students who have previously expressed interest being offered the places. In addition this is subject to a minimum requirement of an average better than 65% and no modules below 50%.

To gain a threshold performance at Part 2, a student shall normally be required to achieve:

- (i) a weighted average of 40% over 120 credits taken at Part 2;
- (ii) marks of at least 40% in individual modules amounting to not less than 80 credits; and
- (iii) marks of at least 30% in individual modules amounting to not less than 120 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 and achieve an overall weighted average of 50% over 120 credits taken in Part 2 (of which not less than 100 credits should normally be at level 5 or above). Students who fail to progress are permitted one re-sit examination in each module in which they obtain less than 50%. For any module passed in a re-sit examination the maximum mark carried forward into the final degree classification will be the higher of (a) the first attempt mark and (b) the lower of 40 and the mark achieved in the re-examination. Failure to progress from 2nd to 3rd year *at first attempt* (i.e. prior to resits) means that the student will not be allowed to take the year in Oklahoma and must resit in Reading to move on to the 3rd year of the BSc programme. Any costs incurred regarding the trip to Oklahoma will not be refunded. If a student has met the requirements for progression, but needs to resit a module(s) arrangements will be made for this to take place at OU. Needs ratifying at faculty level.

In order to progress from Part 3 to Part 4, a student shall normally be required to achieve an overall weighted average of 40% over 120 credits taken in Part 3. Students who fail to progress are permitted one re-sit examination in each module in which they obtain less than 40%. For any module passed in a re-sit examination the maximum mark carried forward into the final degree classification will be the higher of (a) the first attempt mark and (b) the lower of 40 and the mark achieved in the re-examination. Students who do not meet the requirements for progression to Part 4 should discuss their options with the programme director. Because OU do not offer resits, progression is based solely on having an average mark of 40% or more, regardless of the number of modules failed. Students not meeting this requirement will not be allowed to progress to the 4th year. In this case students are able transfer to the final year of the BSc programme.

Mark translation

Main algorithm

The main translation algorithm assumes that there is equivalence between the lettered grades and OU and the degree classifications at UoR. In other words an A at OU is a 1st class honours at UoR, a B is a 2:1, C a 2:2 and so on. The percentage marks are then translated in a piecewise linear fashion between the marks required for the OU grades on either side of the boundary and the marks required for the corresponding UoR classifications. Note that some modules can return marks of over 100% at OU. These are capped at 100% in the UoR scheme.

Grade only algorithm

Some modules at OU only return a grade. In this case the mid-way point of the UoR classification is return. So A=85%, B=65%, C=55% and so on. Note that in some instance a student will see a percentage mark at OU that has not been returned officially to UoR and in these cases we have to work on the grade alone. This is not very common.

Pass/fail modules

Very rarely some modules at OU only return as pass/fail to UoR. In this instance the mark awarded is simply the average UoR mark for all other modules, or 40% in the unlikely case that the average is below 40%.

To gain a threshold performance at Part 3, a student shall normally be required to achieve: an overall average of 40% over 120 credits taken in Part 3, and a mark of at least 30% in individual modules amounting to not less than 120 credits. In order to progress from Part 3 to Part 4, a student shall normally be required to achieve a threshold performance and an overall weighted average of at least 40%.

The criteria for threshold performance are applied after taking due account of the differences between the Oklahoma and Reading marking schemes.

### Summary of Teaching and Assessment

The University's honours classification scheme is:

<i>Mark</i>	<i>Interpretation</i>
70% - 100%	First class
60% - 69%	Upper Second class
50% - 59%	Lower Second class
40% - 49%	Third class
35% - 39%	Below Honours Standard
0% - 34%	Fail

For the University-wide framework for classification, which includes details of the classification method, please see: [www.reading.ac.uk/internal/exams/Policies/exa-class.aspx](http://www.reading.ac.uk/internal/exams/Policies/exa-class.aspx).

The weighting of the Parts/Years in the calculation of the degree classification is

### **Integrated Masters programmes**

Part 2 20%

Part 3 40%

Part 4 40%

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.

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:** Dr Pete Inness

### **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)

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 and learning matters regularly during their termly meeting with their tutor.

## **Career learning**

### **Career prospects**

Graduates gaining a good honours degree are suitably qualified for graduate entry into the UK 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 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**

As part of the degree programme students have the opportunity to study abroad at an institution with which the University has a valid agreement.

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

### **Placement opportunities**

The School of Mathematics and Physical Sciences has a dedicated Placement Officer who can help you find a work placement.

If you are interested in a placement please talk to your personal tutor or the programme director.

## **Programme Outcomes**

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

### **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 attributes**

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

#### **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

4. Collect and integrate evidence to formulate and test hypotheses
5. Identify and understand moral and ethical issues relating to the subject area

**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

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

1. Communication: the ability to communicate knowledge effectively through written and oral presentations.
2. Numeracy and C and 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

**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.**

*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.

**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.

**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 level 6 modules.