# BSc Meteorology with a Foundation Year UCAS code: F958

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| Awarding Institution | The University of Reading |
| Teaching Institution | The University of Reading |
| Relevant QAA subject benchmarking group: | ES3 |
| Faculty of Science | Programme length: 4 years |
| For students entering Part 1 in 2002 | Date of specification: 18/03/2003 |

Programme Director: Mr R Reynolds (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 0 (three terms)**

The *Foundation Year* programme is specified in terms of 44 core *Flexible Approach to Learning* (FLAP) modules in mathematics and physics. These form the text element of the course. The learning programme is based on a supported self-study approach, involving regular tutorials, weekly workshop sessions, and practical classes. For the purposes of assessment, the modules are grouped into two units, one comprising the mathematics modules and one the physics modules. Assessment is based on a combination of weekly 'open book' continuous assessments (44%), practical reports (12%), and two 3-hour Final Examination papers (44%).

**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 |

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

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|---|---|---|---|
| MA111 | # *Mathematics for Scientists* | 20 | C |
| PH1003 | # *Mathematical Physics & Problem Solving* | 20 | C |
| MA112 | # *Applied Mathematics* | 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 1* | 10 | I |
| MT24B | *Atmospheric Physics 1* | 10 | I |
| MT24C | *Numerical Methods for Environmental Sci.* | 10 | I |
| MT25A | *Atmosphere and Ocean Dynamics 2* | 10 | H |
| MT25B | *Atmospheric Physics 2* | 10 | H |
| 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 . Alternatively, the student may select a Level C module (for 20 credits) in a foreign language offered by the Institute Wide Language Programme (IWLP)

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|---|---|---|---|
| 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* | | *Credits* | *Level* |
|---|---|---|---|
| MT36E | *Boundary Layer Meteorology* | 20 | H |
| MT37A | *Part 3 Project* | 30 | H |
| MT37B | *General Studies* | 10 | I |
| MT37C | *Climate and Climate Change* | 10 | H |
| MT38H | *The Global Circulation* | 10 | H |
| MT38J | *Clouds Radiation and Climate* | 10 | H |

*Optional Modules*

| | | | |
|---|---|---|---|
| MT37D | *Remote Sensing Methods and Applications* | 10 | H |
| MT37F | *Extra-tropical Weather Systems* | 10 | H |
| MT37G | *Oceanography* | 10 | H |
| MT38K | *Atmospheric Chemistry* | 10 | H |
| MT38L | *Numerical Weather Prediction* | 10 | H |
| MT38M | *Tropical Weather Systems* | 10 | H |

**Progression requirements**

To proceed to Part 1, it is sufficient to have obtained an average of at least 55% in the Part 0 modules averaged together, and to have achieved an average mark of at least 45% on each of the mathematics and physics units.

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, with no module mark below 30%. Marks of less than 30% in modules to a total of 20 credits, except for MT11A, MT11B and MT12C, may be condoned provided that the candidate has pursued the course for the module with reasonable diligence and has not been absent from the examination without reasonable cause.

To proceed to Part 3 it is sufficient to obtain an average of at least 40% overall, with no module mark below 30%. Marks of less than 30% in modules to a total of 20 credits may be condoned provided that the candidate has pursued the course for the module with reasonable diligence and has not been absent from the examination without reasonable cause.

**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%. Parts 0, 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.

**Admission requirements**

This programme is intended for mature and younger students who either do not satisfy the normal entry requirements for the 3-year programme (F861) 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.

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**

There are no formal arrangements for the 3-year Meteorology programme (but see programme specification for the 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:** | **Teaching/learning methods and strategies** |
|---|---|
| 1. The application of physical and mathematical methods to the description, modelling and prediction of physical phenomena in the atmosphere and oceans<br>2. More specialist topics relating to the Earth's climate system of current research interest<br>3. Impacts of weather, climate and climate change on society and ecology. → | The knowledge required for the basic topics is delineated in formal lectures supported by problem sets for students to tackle on their own.<br>The knowledge required for more specialist topics is enhanced through self-learning based on guided reading, problem solving and project work.<br>The knowledge required for 3 is gained from weekly discussion classes during part 3.<br>Feedback on most of 1 and 2 is provided through formative assessed work.<br><br>*Assessment*<br>Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertation and oral presentation also contribute.<br><br>. |

## *Skills and other attributes*

**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.

**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

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**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 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.