BSc Mathematics   UCAS code: G100

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Relevant QAA subject benchmarking group(s):   Mathematics, Statistics and
                                                        Operational Research
Faculty of Science   Programme length: 3 years
For students entering Part 1 in 2002   Date of specification: March 04
Programme Director: Dr P. Glaister
Programme Adviser: Dr P. Glaister
Board of Studies: Mathematics
Accreditation: -

Summary of programme aims
The BSc programme in Mathematics aims to provide a good general mathematical education
for those not intending to continue as professional mathematicians. This is achieved by
providing core material in the first two years and then in the third year a blend of courses, some
giving an overview of a broad area of mathematics and others studying a particular topic in
depth, along with a range of appropriate subject-specific and transferable skills. (For a full
statement of the programme aims and learning outcomes see below.)

Transferable skills
The University's Strategy for Teaching and Learning has identified a number of generic
transferable skills which 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.

By the end of the programme students are expected to have gained experience and show
competence in the following transferable skills: IT (word-processing, using standard and
mathematics software), scientific writing, oral presentation, team-working, problem-solving,
use of library resources, time-management, and career management and planning.

Programme content
The profile which 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
modules credit for and the level of each module are shown after its title.

Part 1 (three terms)   Credits   Level
Compulsory modules

		Credits	Level
MA11A	*Introduction to Analysis*	20	C
MA11B	*Calculus and Applications*	20	C
MA11C	*Matrices, Vectors and Applications*	20	C
MA11D	*Introduction to Algebra*	20	C

and other modules with a total credit of 40. No further Mathematics modules may be taken in
Part 1.

Students who have taken MA11A, MA11B, MA11C, MA113, AS1A and AS1B or who have taken MA11A, MA11B, MA11C, together with 60 credits of Economics, Meteorology, Physics or Psychology may follow this programme. Such students must take MA24G in Part 2 in place of MA24D and then take MA34D in Part 3 (as part fulfilment of requirement (ii)).

Part 2 (three terms)		*Credits*	*Level*
Compulsory modules			
MA24A	*Analysis*	20	I
MA24B	*Differential Equations*	20	I
MA24C	*Vectors, Dynamics and Numerical Analysis*	20	I
MA24D	*Algebra and Fluid Dynamics*	20	I
MA24E	*Linear Algebra and Coding Theory*	20	I
MA24F	*Communicating Mathematics*	20	I

Part 3 (three terms)		*Credits*	*Level*
Compulsory modules			
MA37A	*Complex Analysis and Calculus of Variations*	20	H
MA37B	*Topics in Applied Mathematics*	20	H
MA37C	*Topics in Pure Mathematics*	20	H

Optional modules:
(i) *At least 40 additional credits of Level H or M Mathematics must be taken in Part 3.*

(ii) *Additional modules to make a total of 120 credits in Part 3.*

Progression requirements
To proceed to Part 2 it is sufficient to obtain an average of at least 40% overall, an average of at least 40% in the Part 1 Mathematics modules taken together, and have no module mark below 30%. Marks of less than 30% in a total of 20 credits, except for MA11A, MA11B, MA11C, MA11D, will 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 from Part 2 to Part 3 it is sufficient to obtain an average of at least 40% in Part 2 and have no module mark below 30%. Marks of less than 30% in a total of 20 credits will 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 both lectures and problems. 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%. Modules in Part 1 and 2 are assessed by a mixture of coursework and formal examination. There are some modules which are assessed wholly by coursework and others wholly by examination; the details are given in the module descriptions.

Part 2 contributes one third of the final assessment and Part 3 the remaining two thirds.

Admission requirements
Entrants to this programme are normally required to have obtained:

Grade C or better in English in GCSE; and achieved
UCAS Tariff: A Level: 260 points including grade B in A Level Mathematics; or
International Baccalaureat: 30 points including 6 in Higher Mathematics; or
Advanced GNVQ: Merit in one of the following subject areas: Engineering, Information
         Technology or Science, accompanied by A Level Mathematics Grade B or
Scottish Highers: Grade A in Mathematics and two Bs and a C in three other subjects.
Irish Leaving Certificate: Grade A in Mathematics and three Bs and a C in four other
         subjects
Two AS grades are accepted in place of one A-Level except in Mathematics.

Admissions Tutor: Dr Graham Williams

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 Mathematics Department additional support is given though practical classes in
Part 1. The development of problem-solving skills is assisted by extensive provision of
model solutions to problems. There is a Course Adviser to offer advice on the choice of
modules within the programme.

Career prospects
Mathematics graduates typically find employment in areas such as finance, accountancy,
actuarial work, management services and teaching, as well as further study and research and
some less common choices. In recent years students who have followed this programme
have gone into jobs as actuarial trainee, trainee chartered accountant, IT management trainee,
teaching, business analyst and postgraduate study.

Opportunities for study abroad or for placements
Although there are no formal arrangements for the BSc Mathematics programme, informal
arrangements may be possible.

Educational aims of the programme
The BSc programme in Mathematics aims to provide a good general mathematical education
for those not intending to continue as professional mathematicians. This is achieved by
providing core material in the first two years and then in the third year a blend of courses, some
giving an overview of a broad area of mathematics and others studying a particular topic in
depth, along with a range of appropriate subject-specific and transferable skills.

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 fundamental concepts and techniques of calculus, analysis, algebra, dynamics and numerical mathematics 2. the use of the basic techniques of mathematics in applicable areas of mathematics, such as differential equations, fluid mechanics, coding theory and numerical analysis 3. a selection of more specialist optional topics 4. some of the breadth of topics which can be tackled by mathematics.	The knowledge required for the basic topics is delineated in formal lectures supported by problem sets for students to tackle on their own. In Part 1 these are supported by tutorials and practical classes through which students can obtain feedback on their non-assessed work. In the later parts of the course students are expected to work at additional problems on their own and seek help when required, using the office hours of staff. Model solutions are provided for problems set. 4. is provided by the modules *Topics in Applied Mathematics* and *Topics in Pure Mathematics*. *Assessment* Most knowledge is tested through a combination of coursework and unseen formal examinations. Dissertations and oral presentations also contribute in other parts of the programme.

Skills and other attributes

B. Intellectual skills – able to:	**Teaching/learning methods and strategies**
1. think logically 2. analyse and solve problems 3. organise tasks into a structured form 4. transfer appropriate knowledge and methods from one topic within the subject to another 5. conduct independent study of a chosen topic and report on the results.	Logic is an essential part of the understanding and construction of mathematical proofs and is embedded throughout the programme. The quality of a solution to a problem is substantially determined by the structure of that response; analysis, synthesis, problem solving, integration of theory and application, and knowledge transfer from one topic to another are intrinsic to high-level performance in the programme. *Assessment* 1- 3 are assessed indirectly in most parts of Mathematics, while 4 contributes to the more successful work. 5 is assessed in the report produced as part of the modules *Topics in Applied Mathematics* and *Topics in Pure Mathematics*.

C. Practical skills – able to:
1. understand and construct mathematical proofs
2. formulate and solve mathematical problems
3. analyse numerical methods and respond to the issues of accuracy, stability and convergence
4. write and present orally a report on a chosen topic.

Teaching/learning methods and strategies
Mathematical proof is taught in Part 1 lectures and reinforced in practical classes. Problem solving is introduced in lectures in Part 1 and forms a large part of subsequent Mathematics. Numerical analysis courses introduce and develop the ideas of accuracy, stability and convergence, illustrated by practical tasks.

Assessment
1 and 2 are tested both formatively in coursework and summatively in examinations. 3 is assessed practically through coursework and the principles through formal examination. 4 is assessed through the project dissertation and its oral presentation.

D. Transferable skills – able to:
1. use IT (word-processing, using standard and mathematical software)
2. communicate scientific ideas
3. give oral presentations
4. work as part of a team
5. use library resources
6. manage time
7. plan their career.

Teaching/learning methods and strategies
The use of IT is embedded throughout the computational side of the course, and in the package *Mathematica* taught in Part 1 mathematics. Team work and career planning are part of one Part 2 module. Communication skills are the focus of one module in Part 2, and these are deployed in the final year project. Time management is essential for the timely and effective completion of the programme. Library resources are required for the small project within one Part 2 module and the final year project, and contribute to the best performances throughout.

Assessment
1 and 2 are assessed through coursework. 3 - 5 contribute assessed coursework towards the Part 2 module *Communicating Mathematics,* and 2, 3 and 5 also in the project. The other skills are not directly assessed but their effective use will enhance performance in later 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 module and programme handbooks.