BSc Applied Statistics

UCAS Code: G301

For students entering Part 1 in 2006

Awarding Institution:	The University of Reading
Teaching Institution:	The University of Reading
Relevant QAA subject benchmarking group:	Mathematics, Statistics and Operational Research: 22 points
Faculty of Life Sciences	Programme length: 4 years
	Date of specification: 9 April 2009
Programme Director:	Dr K L Ayres
Programme Adviser:	Dr K L Ayres
Board of Studies:	Mathematics & Statistics
Accreditation:	Programme is accredited by the Royal Statistical Society

Summary of programme aims and learning outcomes

The programme aims to provide a thorough degree-level education in statistics with a year spent on placement. This is achieved by providing modules which cover the basic principles of drawing conclusions from data, as well as those concentrating on the practical applications of the subject. A distinguishing feature of the programme is that it gives strong emphasis on the practical applications of statistics in a variety of areas, including business, biological sciences, economics, industry, and medicine. The year spent on placement enables students to gain more experience of practical statistics and accordingly make a more informed choice of career. (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 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.

As part of this programme students are expected to have gained experience and show competence in the following transferable skills: IT (word-processing, spreadsheet, database and statistical software), scientific writing, oral presentation, team-working, problem-solving, use of library and internet resources, time-management, and career 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 advisor, to make 120 credits in each Part. The number of credits for each module is shown after its title.

Part 1 (three terms)

			Credits	*Level*
Compulsory modules				
	AS1A	*Communicating with Statistics*	20	C
	AS1B	*Probability and Statistical Methods*	20	C
Selected modules chosen from the following two options:				
Option 1				
Either	AS1C	*Mathematical Methods for Statistics*	20	C
or	MA111	*Mathematics for Scientists*	20	C
and modules to the value of 60 credits from:				
	SE1TQ5	*Commercial Off-the-Shelf Software*	20	C
	LA1***	*Modern Language*	20	C
	EC104	*Economics for Managers*	20	C
	AP1SB1	*Introduction to Management*	10	C
	AP1EM1	*Introduction to Marketing*	10	C
	EC1F1A	*Introductory Microeconomics*	20	C
	EC1F1B	*Introductory Macroeconomics*	20	C
	MA115	*Codes and Code Breaking*	20	C
	MM1F2	*Introductory Financial Accounting*	20	C
	OR *any other approved module(s) of 20 credits.*			
Option 2				
	MA11B	*Calculus and Applications*	20	C
and	MA11C	*Matrices, Vectors and Applications*	20	C
and modules to the value of 40 credits from:				
	SE1TQ5	*Commercial Off-the-Shelf Software*	20	C
	MA11A	*Introduction to Analysis*	20	C
	LA1***	*Modern Language*	20	C
	EC104	*Economics for Managers*	20	C
	AP1SB1	*Introduction to Management*	10	C
	AP1EM1	*Introduction to Marketing*	10	C
	EC1F1A	*Introductory Microeconomics*	20	C
	EC1F1B	*Introductory Macroeconomics*	20	C
	MA115	*Codes and Code Breaking*	20	C
	MA11D	*Introduction to Algebra*	20	C
	MM1F2	*Introductory Financial Accounting*	20	C
	OR *any other approved module(s) of 20 credits.*			

Notes: Not all combinations of options may be available due to timetabling constraints.

Part 2 (three terms)

		Credits	*Level*
Compulsory modules			
AS2A	*Statistical Theory and Methods*	20	I
AS2B	*Linear Models*	20	I
AS2G	*Skills for Statisticians*	20	I
At least one of			
AS2D	*Medical Statistics*	20	I
AS2F	*Study Design and Sampling Methods*	20	I
AS2H	*Forensic Statistics and Genetics*	20	I

AND selected modules to make a total of 120 credits in Part 2 chosen from the following:

MA24A	*Analysis*	20	I
MA24L	*Differential Equations and Fourier Series*	20	I
MA24E	*Linear Algebra and Coding Theory*	20	I
MA24G	*Elementary Algebra*	20	I
MA24J	*Vector Calculus and Numerical Analysis*	20	I
AP2SB1	*Business Management*	10	I
AP2SB2	*Financial Management*	10	I
AP2EM1	*Marketing Management*	10	I
EC203A	*Introductory Econometrics I.1*	20	I
EC203B	*Introductory Econometrics I.2*	10	I
MM270	*The Practice of Entrepreneurship*	20	I
LA1***	*Modern Language*	20	C
PS2N45	*History and Philosophy of Science*	20	I
PS2NA4	*Introduction to the History and Philosophy of Science*	10	I

OR *Any other approved module(s) of 20 credits*

Part 3 (three terms)

		Credits	*Level*
Compulsory modules			
AS3A	*Advanced Statistical Modelling*	20	H
AS3F	*Statistics Research Project*	40	H
At least one of			
AS3C	*Analysis of Structured Data*	20	H
AS3D	*Operational Research Techniques*	20	H
AS3G	*Study Design and Sampling Methods*	20	H

and selected modules to make a total of 120 credits of which at least 100 credits must be at Level H. This may include

AS2D	*Medical Statistics*	20	I
AS2H	*Forensic Statistics and Genetics*	20	I
MM270	*The Practice of Entrepreneurship*	20	I
LA1***	*Modern Language*	20	C
MA34L	*Differential Equations and Fourier Series*	20	H
MA3LA	*Linear Algebra*	10	H
MA3CT	*Coding Theory*	10	H

MA3VC	*Vector Calculus*	10	H
MA3NA	*Numerical Analysis*	10	H
MA3SM	*Modelling of Soft Matter*	10	H
MA3ASP	*Applied Stochastic Processes*	10	H
MA3MB	*Mathematical Biology*	10	H
MA3D7	*History of Mathematics and its Applications*	10	H
MA3W7	*Control Systems*	10	H
MA3Z7	*Number Theory*	10	H
MA3DY	*Dynamics*	10	H
MA3C7	*Boundary Value Problems*	10	H
AP3EM1	*Marketing Strategy*	10	H
AP3EM2	*Marketing Research Methods*	10	H
MM379	*Social Enterprise*	20	H

Placement year (Module AS2PY, Level I, 120 credits)

Between Parts 2 and 3 of the programme, one year will be spent on placement in an appropriate organisation.

Progression requirements

To gain a threshold performance at Part 1 a student shall normally be required to achieve an overall average of 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 to obtain an average of at least 40% in the two compulsory Statistics modules taken together, with at least 30% in each of these two modules.

To gain a threshold performance at Part 2 and qualify for the DipHE a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 2, and a mark of at least 30% in individual modules amounting to not less than 100 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 have no module mark below 30% at the first attempt for the compulsory statistics modules. Students who pass Part 2 at resit are eligible to continue on the Statistics programme.

Satisfactory completion of the placement period (determined on the basis of the student's progress during the year, a report from their employer and the student's own report) is required for continuation into Part 3 of the four-year degree programme in Applied Statistics. Those who do not complete the placement year satisfactorily will be permitted to continue to Part 3 of the three-year degree course in Statistics.

Summary of teaching and assessment

Teaching is organised in modules that typically involve both lectures and practicals. The assessment is carried out within the University's degree classification scheme, details of which are in the programme handbook. The pass mark in each module is 40%. Modules are normally assessed by a mixture of coursework and formal examination, although some are assessed wholly by coursework. The Part 3 project is essentially self-study,

supported by a series of tutorials, and is assessed as coursework. Part 2 contributes one third of the overall assessment, and Part 3 the remaining two thirds.

Admission requirements

Entrants to this programme are normally required to have obtained:

UCAS Tariff: A Level: 280 points including at least AS Mathematics; *or*

International Baccalaureate: 29 points including 5 in Mathematics; *or*

Irish Highers: BBBBB, including Mathematics.

Admission Tutor: Dr K L Ayres (Applied Statistics)

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 though practical classes, and the development of problem-solving skills is assisted by provision of model solutions to exercises. Advice on statistical computing is available from the statistical computing staff in the School, and copies of software manuals are held in a computing library. There is a Programme Adviser to offer advice on the choice of modules within the programme.

Career prospects

In recent years, students who have followed this programme have entered careers as statisticians in the pharmaceutical industry, financial institutions, insurance companies, and university medical schools. Graduates from this programme will automatically be granted Graduate Statistician status on application to the Royal Statistical Society, provided that at least Second Class Honours have been achieved.

Opportunities for study abroad

The year on placement may be spent abroad. In recent years, students have taken up placements in pharmaceutical companies in Switzerland and Germany.

Educational aims of the programme

The programme aims to provide a thorough degree-level education in statistics. The programme covers the basic ideas of summarising and presenting data, statistical inference and linear modelling. Strong emphasis is given to practical applications of the subject, and the use of statistical software in data analysis.

Programme outcomes

The programme provides opportunities 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 data summary and presentation, statistical inference and linear modelling 2. the application of statistics in a variety of areas 3. a selection of more specialist optional topics 4. the use of statistical software in data analysis.	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 additional help and feedback on their work. In the programme students are expected to work on practical problems on their own and seek help when required. Model solutions are provided for problems set. *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. recognise and use appropriate statistical methods in data analysis 6. plan, conduct and write a report on an independent project.	Logic is an essential part of the understanding of statistical techniques, and the use of statistical software for data analysis is embedded throughout the programme. The quality of solutions 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* Skills 1-3 are assessed indirectly in most parts of the programme, while 4 contributes to the more successful work. Skills 5 and 6 are assessed in practical work in Parts 2 and 3.

C. Practical skills – able to:

1. plan, conduct and report on the results of statistical investigations
2. formulate and solve statistical problems
3. use statistical software in an effective manner
4. write and defend a report on a chosen topic
5. gain work experience through spending a year on placement.

Teaching/learning methods and strategies
Lectures, practical work and assignments are designed to enhance skills 1-4.

Assessment
Skills 1 and 2 are tested both formatively in coursework and summatively in examinations. Skills 3 and 4 are assessed in coursework that involves computer based analysis. Skill 5 is assessed on the basis of progress during the year, and reports from the employer and student.

D. Transferable skills – able to:

1. use IT (word-processing, spreadsheets and statistical software)
2. communicate scientific ideas
3. give oral presentations
4. work effectively as part of a team
5. use library and internet resources
6. manage time
7. plan their career.

Teaching/learning methods and strategies
The use of IT is embedded throughout the programme, and in the packages Minitab and SAS taught in Parts 1 and 2. Team work and career planning are part of the module *Skills for Statisticians*. Communication skills are enhanced in Part 2, and are deployed in modules in Parts 2 and 3. Time management is essential for the timely and effective completion of the programme. Library and internet resources are required for certain assignments, in particular the final year project, and contribute to the best performances throughout. The placement year will provide opportunities to develop each of these skills.

Assessment
Skills 1 and 2 are assessed through coursework. Skills 2-5 contribute assessed coursework towards the module *Skills for Statisticians.* Effective use of these skills 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 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 processes or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.**