

**ACADEMIC SERVICES**

**PROGRAMME SPECIFICATION**

Part 1: Basic Data		
<b>Awarding Institution</b>	University of the West of England, Bristol	
<b>Teaching Institution</b>	University of the West of England, Bristol	
<b>Delivery Location</b>	Frenchay Campus	
<b>Faculty responsible for programme</b>	Environment and Technology	
<b>Department responsible for programme</b>	Engineering Design and Mathematics	
<b>Modular Scheme Title</b>		
<b>Professional Statutory or Regulatory Body Links</b>	Royal Statistical Society	
<b>Highest Award Title</b>	BSc(Hons) Mathematics and Statistics	
<b>Default Award Title</b>		
<b>Interim Award Titles</b>	BSc Mathematics and Statistics Diploma of Higher Education Mathematics and Statistics Certificate of Higher Education Mathematics and Statistics	
<b>UWE Progression Route</b>		
<b>Mode(s) of Delivery</b>	Full-time	
<b>Codes</b>	<b>UCAS:</b> G30A	<b>JACS:</b>
	<b>ISIS2: G400</b> G30B (SW), (G30B13) FT/PT	<b>HESA:</b>
<b>Relevant QAA Subject Benchmark Statements</b>	Mathematics Statistics and Operational Research <a href="http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Maths07.pdf">http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Maths07.pdf</a>	
<b>CAP Approval Date</b>	June 2015	
<b>Valid From</b>	September 2015	
<b>Valid until Date</b>	September 2018	
<b>Version</b>	1	

## Part 2: Educational Aims of the Programme

Students graduating from this programme will have the necessary knowledge and skills to gain employment as professional statisticians. Mathematics and Statistics graduates are employed across the economy, for example for government organisations, in business and marketing, health, finance, industry and research organizations.

Students develop a range of analytical and interpretative skills as they progress through the programme, gaining experience of real applications of their chosen subject. The placement year offers the opportunity to experience working within an organization as part of a team of statistical analysts. BSc Mathematics and Statistics has a common first year with BSc Mathematics and sufficient commonality in the second year to allow students to transfer between the two awards before entering the final year. Hence many of the outcomes of the BSc Mathematics programme are available to students on BSc Mathematics and Statistics.

The programme develops a number of interconnected strands or themes such as data analysis, experimental design, statistical modelling and research, decision modelling and operational research together with mathematical themes such as modern applied mathematics, computational mathematics, and applied algebra and geometry. Students are informed about the future employment opportunities open to graduates through stand-alone employability sessions and employer talks.

The BSc(Hons) Mathematics and Statistics has the following educational aims:

1. To produce graduates who have the necessary knowledge and skills to develop careers as professional statisticians and are familiar with concepts and skills of Mathematics, Statistics and Operational Research that will enable them to gain employment in a number of sectors including science, technology, government and business;
2. To develop understanding of the underlying and unifying mathematical concepts that underpin the different branches of the discipline;
3. To prepare students for progression to study higher degrees in Statistics and Operational research;
4. To develop analytical, problem-solving transferable skills that will be valuable to graduates in any career;
5. To develop the ability to apply statistical and operational research concepts in a range of contexts;
6. To develop an understanding of the modelling process as applied to a range of problems in different contexts;
7. To develop the ability to use a range of specialised computer software to solve problems in the mathematical sciences.
8. To ensure that graduates can communicate effectively through presentations and through written reports;
9. To continue the development of those general study skills that will enable students to become independent lifelong learners;
10. To encourage the discerning use of reference material from a variety of sources.

## Part 3: Learning Outcomes of the Programme

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

Learning Outcomes	Teaching, Learning and Assessment Strategies
<b>A Knowledge and Understanding</b>	
<b>A Knowledge and understanding of:</b>  1. a wide range of methods for the statistical presentation, analysis and modelling of data and processes;	<b>Teaching/learning methods and strategies:</b> <ul style="list-style-type: none"> <li>• The application of theory is encouraged through problems from different branches of mathematics and different applications.</li> <li>• Independent learning is encouraged to consolidate</li> </ul>

### Part 3: Learning Outcomes of the Programme

<p>2. the design and analysis of experiments;</p> <p>3. the theoretical underpinning and application of a wide range of methods for statistical analysis, design of experiments and data modelling;</p> <p>4. the practical application of statistical and operational research techniques to solve realistic problems drawn from a variety of application areas; e.g. health, government, social science, science, business and technology;</p> <p>5. analytical techniques used to solve problems involving linear systems;</p> <p>6. analytical techniques used to solve problems involving discrete mathematical objects;</p> <p>7. computational techniques for solving problems in mathematics, statistics and operational research;</p> <p>8. the application of computer software to analyse and solve mathematical and statistical problems;</p> <p>9. the modelling process, applied to a variety of problems, using techniques from mathematics, statistics and operational research</p> <p>10. the role of quantitative methodology in empirical investigations</p>	<p>and broaden subject knowledge and understanding.</p> <ul style="list-style-type: none"> <li>• There are no core modules at level three. The acquisition of the learning outcomes is via the level one and level two core developed further through the options at levels two and three, which provide the flexibility for students to follow different paths.</li> <li>• Achievement of each of the learning outcomes would be enhanced by a suitable project taken via the level three option “Mathematics, Statistics and Operational Research Project”.</li> </ul> <p><i>Acquisition of 1, 2, 3 and 4:</i> through the level one core “Statistical Reasoning”, the level 2 core “Statistical Modelling”, “Mathematical Statistics” and the level three core “Statistical Research Methods”, “Multivariate Statistical Modelling” and the “Mathematics, Statistics and Operational Research Project”.</p> <p><i>Acquisition of 5:</i> through the level one core “Sets, Functions and Linear Algebra”, “Calculus and Numerical Methods”, and “Modelling and Optimisation”, through all core modules at level 2 and “Multivariate Statistical Modelling” at level 3.</p> <p><i>Acquisition of 6:</i> Level one core “Sets, Functions and Linear Algebra” followed by the level two core “Algebra, Combinatorics and Graphs”. Students may take the level three option “Applied Algebra and Geometry”.</p> <p><i>Acquisition of 7:</i> Developed via the level one core; “Calculus and Numerical Methods” and “Modelling and Optimisation”, and level two core; “Mathematical Methods”, “Statistical Modelling” and “Operational Research”. The knowledge is then developed further through the level three core the level three core “Applied Statistical Research Methods”, “Multivariate Statistical Modelling” and the “Mathematics, Statistics and Operational Research Project”.</p> <p><i>Acquisition of 8:</i> Level one core “Calculus and Numerical Methods”, “Statistical Reasoning” and “Modelling and Optimisation” and level two core; “Mathematical Methods”, “Statistical Modelling” and “Operational Research”. Further development at level three is provided by “Statistical Research Methods”, “Multivariate Statistical Modelling” and the “Mathematics, Statistics and Operational Research Project”.</p> <p><i>Acquisition of 9:</i> Level one core; “Modelling and Optimisation”, then developed further in all level two core modules, particularly “Statistical Modelling”. Further development at level two via the option “Operational Research” and at level three “Multivariate Statistical Modelling” and the “Mathematics, Statistics and Operational Research Project”.</p> <p><i>Acquisition of 10:</i> Initiated at level one through “Statistical Reasoning” then developed in depth at level two through “Statistical Modelling”. The learning outcome is covered in all level three core modules.</p> <p><b>Assessment:</b> Throughout the programme, testing of the knowledge base is</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Part 3: Learning Outcomes of the Programme**

via written reports, regular short tests, and through tasks taken under controlled examination conditions. Thus, all students will achieve these learning outcomes.

**B Intellectual Skills**

**B Intellectual Skills**  
Graduates will have the ability to:

1. think logically and use symbolic language to describe the relationships between real and abstract quantities in the context of mathematical, statistical and operational research problems;
2. communicate mathematical and statistical arguments, using appropriate notation, in a clear and precise manner
3. conduct empirical investigations in statistical science and draw robust and rigorous conclusions.
4. critically interpret solutions obtained using statistical and operational research techniques and report conclusions in a clear and appropriate manner;

**Teaching/learning methods and strategies:**

Intellectual skills are developed through tutorials and workshops that stimulate the student’s analytical and problem-solving abilities and through computer practical sessions that stimulate the student’s ability to design and test algorithms and apply specialist software to the solution of. Students are encouraged to discuss their work in class and, in certain core modules make informal presentations of mathematical arguments.

*Acquisition of 1 and 2:* Developed throughout the programme with all modules contributing to the development of these skills at different levels.

*Acquisition of 3:* Initiated at level one through “Statistical Reasoning” then developed in depth at level two through “Statistical Modelling” and “Mathematical Statistics”. The skill is further developed in all level three core modules.

*Acquisition of 4:* Developed throughout the programme with all modules contributing to the development of this skill at different levels.

**Assessment:** These intellectual skills are primarily assessed in most modules through written assignments and examinations. The balance of coursework and examination varies from module to module. Independent learning is assessed through open ended assignment tasks and via a requirement in some assignments at Levels Two and Three to research a topic or to acquire new knowledge as part of the assessed activity.

**C Subject, Professional and Practical Skills**

**C Subject, Professional and Practical Skills**  
Graduates will be able to:

1. adopt different problem solving approaches from mathematical, statistical and operational research to problems that arise in a variety of contexts;
2. use statistical and mathematical language, notation and methods in the description and analysis of problems in appropriate areas of application;
3. communicate the results from a statistical investigation in a manner that is appropriate for a non technical audience;

**Teaching/learning methods and strategies:**

The understanding and application of mathematical, statistical and operational research techniques to a variety of problems in the business and scientific community is a key outcome of the award.

Professional and practical skills are developed through tutorials, workshops and computer practical sessions, and also through the programme of graduate development activities undertaken at each level. The mathematical theory underpinning the methods of solution and analysis is introduced in level one core and developed further through level two core. In the option modules, specialised applications are considered at levels two and three covering a broad spectrum of application areas.

*Acquisition of 1, 2, 3 and 4:* Developed throughout the

### Part 3: Learning Outcomes of the Programme

<p>4. conduct statistical investigations and analyses in a variety of contexts relevant to government, science and industry;</p> <p>5. design and implement a coherent and rigorous quantitative research strategy as part of an individual research project.</p> <p>6. customise and apply specialist statistical software as part of a statistical investigation or research project.</p>	<p>programme with all modules contributing to the development of these skills at different levels.</p> <p><i>Acquisition 5:</i> Fundamental concepts are established at level one through Statistical Reasoning, with the development of statistical research skills undertaken at level two in “Statistical Modelling”. The development of the skill is ensured by the level three core programme “Statistical Research Methods”, “Multivariate Statistical Modelling” and “Mathematics, Statistics and Operational Research Project”.</p> <p><i>Acquisition of 6:</i> Initiated at level one through “Calculus and Numerical Methods”, developed further at level two through “Mathematical Methods” and “Statistical Modelling”. Developed to a higher level in each of the level three core modules.</p> <p><b>Assessment:</b> These subject, professional and practical intellectual skills are primarily assessed in most modules through written assignments and examinations. The balance of coursework and examination varies from module to module according to the extent to which these skills are covered. However, all students will study modules where they will need to demonstrate these attributes at Levels Two and Three.</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### D Transferable Skills and other attributes

<p>D Transferable Skills and other attributes</p> <p>Graduates will be able to</p> <ol style="list-style-type: none"> <li>1. communicate using professional standards of English, both orally and through written technical reports;</li> <li>2. demonstrate the ability to manage their own time and meet deadlines;</li> <li>3. work in teams and take responsibility for individual and shared objectives;</li> <li>4. use IT skills in context and to learn how to use new software tools to develop and to implement solutions;</li> <li>5. take a logical and systematic approach to problem formulation, solution and decision making;</li> <li>6. demonstrate the ability to learn independently;</li> <li>7. to be able to critically to review available literature including published papers relevant to the subject discipline;</li> </ol>	<p><b>Teaching/learning methods and strategies:</b></p> <p><i>Acquisition of 1:</i> is through participation in workshops, group work discussions, tutorial discussions and presentations, written reports for assessed coursework.</p> <p><i>Acquisition of 2:</i> is through self-managed assessed and non-assessed practical work, preparation for tutorials and workshops, preparation for examinations and group work activities.</p> <p><i>Acquisition of 3:</i> is through a group-based assignment at level 1 and group based tasks carried out as part of preparing for academic sessions and activities conducted as part of the programme of graduate development undertaken at each level.</p> <p><i>Acquisition of 4:</i> is through regular computer practical work at each level with assessed work covering a broad spectrum of contexts from mathematics, statistics and operational research.</p> <p><i>Acquisition of 5:</i> is through the extensive exposure throughout the programme to investigations and models from different branches of the discipline.</p> <p><i>Acquisition of 6:</i> is the through the reading and assessment strategy modules, where students are encouraged and required to broaden their knowledge of the subject by reading more widely and to research new techniques or new applications as part of their assessed coursework. This skill is developed to a high level in those who elect to take a project at level three.</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### Part 3: Learning Outcomes of the Programme

*Acquisition of 7:* is through the reading and assessment strategy for modules where students are encouraged to access and review literature for discussion in tutorials and demonstrate knowledge of relevant literature in assessed coursework, particularly at level three.

**Assessment:** These transferable skills assessed throughout the programme through coursework and examination. All students will study modules at Levels two and three where they will need to demonstrate these skills.

### Part 4: Programme Structure:

This structure diagram demonstrates the student journey from Entry through to Graduation for a **full time student**, including: level and credit requirements; interim award requirements; module diet, including compulsory and optional modules.

	<b>Compulsory Modules</b>	<b>Optional Modules</b>	<b>Interim Awards</b>
Year 1	UFMFL3-30-1 Sets, Functions and Linear Algebra  UFMFK3-30-1 Calculus and Numerical Methods  UFMFPA-30-1 Statistical Reasoning  UFMFM3-30-1 Modelling and Optimisation	None	Certificate of Higher Education Mathematics and Statistics
Year 2	UFMFNA-30-2 Statistical Modelling  UFMFG9-15-2 Mathematical Statistics  UFMF7A-15-2 Operational Research  UFMFC7-30-2 Algebra, Combinatorics and Graphs  UFMFF9-30-2 Mathematical Methods	None	Diploma of Higher Education Mathematics and Statistics
<p><i>Year Out:</i> Students may elect to spend a minimum of 40 weeks working for an organisation, in a role where mathematical and statistical methods are used in the workplace. <u>Placement Option:</u> <b>Industrial Placement</b> UFMF89-15-3</p>			



Year 3	<p><b>Compulsory Modules</b></p> <p>UFMFK7-30-3 Statistical Research Methods</p> <p>UFMFW9-30-3 Multivariate Statistical Modelling:</p>	<p><b>Optional Modules</b></p> <p><i>Select 15 or 30 credits from the project options (Students who have passed UFMF89-15-3 should select UFMFV9-15-3. All other students must select UFMFU9-30-3.</i></p> <p>UFMFU9-30-3 Mathematics, Statistics &amp; Operational Research Project A</p> <p>UFMFMV9-15-3 Mathematics, Statistics &amp; Operational Research Project B</p> <p><i>Select at most 30 credits from the mathematics options</i></p> <p>UFMFUG-15-3 Financial Mathematics</p> <p>UFMFMVG-15-3 Fluid Dynamics</p> <p>UFMFMWG-15-3 Applied Algebra &amp; Geometry</p> <p>UFMFK8-30-3 Dynamical Systems</p> <p>UFMFMX9-30-3 Numerical Analysis</p> <p>UFMFMFY7-30-3 Decision Modelling</p>	<p><b>Interim Awards</b></p> <p>BSc Mathematics and Statistics 300 credits at appropriate level</p> <p><b>Highest Award</b> BSc(Hons) Mathematics and Statistics</p> <p>360 credits at appropriate level</p>
--------	-------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## GRADUATION

### Part 5: Entry Requirements

The University's Standard Entry Requirements apply\*: The UCAS points tariff will be reviewed on a regular basis and published for new applicants. However, an applicant to this programme will typically have an A-level in mathematics at grade A or at grade B.

Applicants without A-level mathematics at the appropriate grade, or an equivalent qualification, will be considered on a case-by-case basis.

Tariff points as appropriate for the year of entry and up to date requirements are available through the [courses database](#).

### Part 6: Assessment

Approved to University Regulations and Procedures

## Assessment Map

The programme encompasses a range of **assessment methods** including: unseen examinations; partially seen examinations, where students are given scenarios to research and study prior to an unseen question; short reports; extended reports; group investigations; e-assessment (computer based tests and assignments marked using a computer algorithm). Dependent on option choices, students may also be assessed using presentations or essays. These are detailed in the following assessment map:

### Assessment Map for BSc(Hons) Mathematics and Statistics

		Unseen Written Exam	Partly Seen Written Exam	Computer Based Exam	Practical Skills Assessment	Oral assessment and/or presentation	Written Assignment	Computer based tests	In class Written Tests	Essay	Report / Project	Dissertation	Oral Presentation	Portfolio
Compulsory Modules Level 1	UFMFL3-30-1	A (75)						B(25)						
	UFMFK3-30-1	A (75)					B(17.5)	B(7.5)						
	UFMFPA-30-1	A(75)												B(25)
Compulsory Modules Level 2	UFMFM3-30-1	A (75)					B(20)	B(5)						
	UFMFF9-30-2	A(50)					B(50)							
	UFMFNA-30-2		A(50)						B(50)					
	UFMFC7-30-2	A(75)					B(25)							
Compulsory Modules Level 3	UFMF7A-15-2			A(25)			B(75)							
	UFMFG9-15-2	A(75)					B(25)							
	UFMFK7-30-3	A(50)					B(50)							
Option Modules Level 3	UFMFW9-30-3	A(50)					B(50)							
	UFMFJ7-30-3	A(75)					B(25)							
	UFMFK8-30-3	A(75)					B(25)							
	UFMFX9-30-3	A(50)			B(10)		B(40)							
	UFMFY7-30-3	A(50)					B(50)							
	UFMFUG-15-3	A(75)					B(25)							
	UFMFVG-15-3	A(75)					B(25)							
	UFMFWG-15-3	A(75)					B(25)							
UFMFU9-30-3										A (20)	A(70)	A(10)		
UFMFV9-15-3											A(85)	A(15)		

\*Assessment should be shown in terms of either **Written Exams**, **Practical exams**, or **Coursework** as indicated by the colour coding above.



## Part 7: Student Learning

### Teaching, learning and assessment strategies to enable learning outcomes to be achieved and demonstrated

At UWE, Bristol there is a policy for a minimum average requirement of 12 hours/week contact time over the course of the full undergraduate programme. This contact time encompasses a range of face-to-face activities as described below. In addition, a range of other learning activities will be embedded within the programme which, together with the weekly contact time, will enable learning outcomes to be achieved and to be demonstrated.

**Class Activities:** The mode of delivery of a module is determined by its Module Leader, and typically involves a combination of one or more lectures, tutorials, workshops and computer practical sessions. Workshops can involve individual or group activities, with students' making informal presentations of their work. Those opting for a final year project will have the support of a project advisor.

**Academic Support:** Academic advice and support is the responsibility of staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or during published "surgery" hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Drop-by, one-to-one tuition is available every day through the *espressoMaths* service, which provides access to mathematics and statistics academic staff.

Peer Assisted Learning (PAL) is used to support learning at Level One. Each student has access to one PAL session per week, this session being run by a second year student who is trained as a PAL leader to assist students on problems that they face in any of the modules that they are studying.

**Personal Development:** Each student is allocated an academic personal tutor who will ensure student engagement with the academic programme and assist with the delivery of generic skills through a programme of graduate development. At Level One this is designed to equip students with the necessary skills and information to help them develop as effective learners and to approach their work with confidence. Level Two work is designed to help the student recognise, describe and demonstrate their academic achievements and skills in preparation for their placement year and future career prospects. At Level Three, this should help them to plan their own 'preferred future' and to present their skills, attributes and abilities in a way that will help them achieve their goals.

**Pastoral Care:** The University divides responsibilities for pastoral care between academic personal tutors who look after the academic well-being of students and Student Advisors who provide comprehensive, full-time student support on a range of issues including funding, academic regulations, personal and health issues. The service operates on a drop-in basis or by appointment.

**Progression to Independent Study:** Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available to support students in this activity. The philosophy is accordingly to offer students both guided support and opportunities for independent study. Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, workshops and computer practical sessions. Students are expected to attend all sessions on their timetable.

The progression to independent study will also be assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to encouraging students to plan ahead and to take responsibility for managing their time and resources.

**Computing Facilities:** The faculty offers a specialised computing facility alongside the general University provisions. A range of computer laboratories with access to Microsoft or Unix operating systems are available for students to use when not in use for teaching. An open access computer laboratory with 24 hour opening is extensively used by students for the completion of coursework activities. Specialist mathematical and software used in the programme is part of the standard build for the Faculty's computer laboratories. All specialist software used in the programme is currently available

## Part 7: Student Learning

to students for home use free of charge.

### Description of Distinctive Features and Support

**Learning Support:** The Mathematics and Statistics cluster contains staff who are active in national teaching and learning projects, working with colleagues in other universities to develop new approaches in the delivery and support of programmes in mathematics, statistics and operational research.

Distinctive features of our support to students.

- Mathematics Resource Centre that provides dedicated space for students to carry out group work and to practice presentations.
- *espressoMaths* that provides drop-by one-to-one tuition each day in the student canteen and also a web-site that provides a portal to a variety of online resources in mathematics and statistics.
- Computer based e-assessment: implemented in a number of first year modules, so that students can take regular short tests, with automated computer generated feedback.
- Provision of online materials through the university virtual learning environment including lecture recording with respect to some modules.

**Employability:** We recognise that many students entering this programme will not have clearly developed ideas as to their future career direction. We have therefore embedded activities within the programme delivery that are designed to support students as they develop their interests and future career plans.

- A programme of graduate development activities is delivered at each level, promoting awareness of employment opportunities open to graduates of mathematics and statistics. This programme includes development of transferable skills, researching the graduate employment market and preparing a CV. At Level Two, employers and recent graduates are invited to the University to speak to students and to encourage participation in the placement year. At Level Three we concentrate on academic achievement and future plans.
- The optional placement year provides extensive and valuable experience of the workplace.
- The department's extensive outreach programme provides opportunities for students to work with young learners in local secondary schools. The work involves learning to be part of a team, and it provides opportunities to develop leadership skills, confidence and independence.
- The final year module *Mathematics Education Project* provides a work-based learning opportunity for students who are thinking about becoming a mathematics teacher. Places are limited by the number of school placements that can be supported in a given year and so are decided by a competitive application process.

## Part 8: Reference Points and Benchmarks

This programme has been prepared with reference to a number of external benchmarks, including the QAA Subject Benchmark Statements for Mathematics, Statistics and Operational Research, the QAA Framework for HE Qualifications and the University's Learning and Teaching Strategy.

The Subject Benchmark Statements for Mathematics, Statistics and Operational Research emphasises the diversity of programmes that are likely to draw upon this benchmark. It notes that some programmes give a broad coverage of a wide area of topics that fall within the scope of mathematical and statistical subjects, while others develop particular subject areas in depth.

<http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Maths07.pdf>

The BSc Statistics programme provides that broad coverage of topics from mathematics, statistics and operational research allowing specialisation in advanced statistical modelling and research techniques during the latter stages of the award. The programme provides a sound theoretical background for the study of quantitative research methods at postgraduate level. While highlighting certain core topics to be included in a BSc Statistics programme, the subject benchmark emphasises the development of logical thinking, rigour, problem solving and model building as core skills for statistics graduates.

## **Part 8: Reference Points and Benchmarks**

The design and content of programme has been informed by employer input through our student placements, by employer participation at our graduate development and outreach events and by our consultancy activities.

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 individual modules can be found in module specifications, available on the University's website.