UNIVERSITY OF BATH

Programme Specification

GENERAL INFORMATION	
Programme title	BSc Economics and Mathematics
Awarding Institution//Body	University of Bath
Teaching Institution	University of Bath
Programme accredited by (including date of accreditation)	n/a
*Subject Benchmark Statement**Subject Benchmark Statement:	http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/Economics.pdf http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/MathsAnnex09.pdf
Date of Specification preparation/revision	
Applicable to cohorts	
Programme Approved by	

Synopsis and academic coherence of programme

Economics and Mathematics are very natural academic companions. Mathematics is an excellent language in which to develop economic theory in a rigorous and logical way. It also provides methodological and statistical tools for critical analysis of data; for its part, Economics offers many convenient examples with which to illustrate advances in mathematical theory and applications.

Combining the study of economics and mathematics provides students with appropriate and complementary skills for postgraduate Masters study in either discipline or for a wide range of careers. Some graduates wish to pursue careers as mathematical and/or applied economists, others will follow careers in mathematics/statistics, but a firm disciplinary base in economics and mathematics also provides the basis for career paths, for example, in finance, accountancy, business and management consultancy. Students benefit from the many and well-established links with the financial sector, industry, government and international organisations that have been developed by both departments through their placement schemes and research activities.

The programme is taught over three years, with the option of an additional year on placement (Year 3 of 4).

The programme has been designed around a number of themes that combine to meet the aims and learning outcomes of the programme. These themes are intended to be consistent with the subject specific skills of the Benchmark Statements in Economics and Mathematics, Statistics and Operational Research and focus on developing students' analytical, conceptual and quantitative skills in both economics and mathematics.

The programme will provide students with a secure understanding of the core elements of economics (microeconomic theory, macroeconomic theory, econometrics). Microeconomics and macroeconomics are compulsory in all three years whilst econometrics is compulsory in year 2 and optional in year 3. The foundations for the mathematical component of the programme are laid in year 1 where students take compulsory units in Analysis, Algebra, Probability and Statistics. This gives students the necessary broad base from which they can pursue two of these pathways in year 2, combining: Statistics and Probability, Algebra and Statistics, Analysis and Statistics, Algebra and Probability, Algebra and Analysis, or Analysis and Probability. Students can continue to deepen and specialise in one or other or both of these selected areas in their final year (from MA level 3 and 4 options lists), or pick up one of the year 2 streams not taken in year 2, or select other year 2 options in applied mathematics which open up additional choices in the final semester, thereby adding breadth to the student's programme.

The amount of student choice increases with progression through the programme. In terms of weightings, the first year is predominately mathematical, in order to lay the necessary mathematical foundations and permit sufficient range of choice in years 2/3 (year 1: Maths 42 credits, Economics 18 credits). In year 2 the emphasis is on developing core economics, building on and integrating mathematical skills laid in the first year (Maths 24 credits, Economics 36 credits). The final year requires a minimum of 24 credits from each of Economics and Maths, the balance being a matter of student choice.

As there is sufficient commonality between the Bachelor Economics and Maths (henceforth BEM) and single honours Economics there is flexibility to change programme from BEM to Economics during and at the end of the first year. It may also be possible to transfer from BEM into one of the degree programmes offered by the Department of Mathematical Sciences provided that a request is made before the end of the first semester of the first year.

Educational aims of the programme

Our primary aim is to develop in our students an understanding of the theories and tools of economics and mathematics that can be used to analyse contemporary problems and policy. The aims of the programme are to:

- introduce students to the major branches of mathematics and economics;
- enable students to apply mathematical and statistical methods to analyse and evaluate economic problems so that they can reach considered and appropriate conclusions, and can competently communicate the reasoning behind these conclusions;

- meet the needs of students with different aspirations within mathematics and economics;
- enable students to appreciate the coherence, logical structure, and broad applicability of mathematics;
- enable students to appreciate the different approaches, concepts and applications in economics;
- impart an awareness of the values of research and scholarship in mathematics and economics;
- accustom students to the use of designated software that is available within mathematics and economics;
- provide a thorough training in the intellectual skills and advanced techniques of modern economics and mathematics;
- develop the ability of students to abstract and generalize, to model various phenomena, and to interpret numerical and empirical data;
- enable students to develop the skills associated with problem solving, rigorous argument and communication;
- broaden and deepen the economic and mathematical background of students;
- prepare students to work in fields where specific and broadly based advanced knowledge in mathematics and economics is required;
- enable students to embark on research in some area of mathematical economics, economic theory or empirical/statistical economics.

Educational aims of the placement year (4 year thick sandwich programme only):

- give students an opportunity to apply their knowledge in practice and see how what they have learned fits into the workplace;
- prepare students for employment by gaining practical experience in the real world;
- enable the student to make informed decisions about the direction of their future career;
- give students the opportunity to build professional networks and secure contacts for the future.

• Knowledge & Understanding:	• Knowledge of core economic theory. I.e. microeconomics (decision and choice problems, production decisions, exchange of goods, market pricing, general equilibrium of an economy, principal-agent relationships, incentives, welfare notions) and macroeconomics (employment, national income, balance of payments, income distribution, inflation, growth, business cycles, money and finance). • Understanding of economic policy at microeconomic and macroeconomic levels. • Knowledge of computing techniques, and mathematical and statistical methods (esp. econometrics), along with exposure to economic, financial, and social data and econometric software. • Knowledge and understanding of, and ability to use mathematical methods and techniques, esp. calculus and linear algebra, constrained optimization and its application to allocating scarce resources, modelling of different decision-making processes, critical understanding of analytical methods and models, and how and when they can be applied. • An understanding of the importance of assumptions and awareness of where they are used and of possible consequences of their violation. • An understanding of the power of generalization and abstraction in developing mathematical and economic theories or methods to use in problem solving. • Knowledge and understanding of modelling (i.e. formulating problems in mathematical or statistical form using appropriate notation).
• Intellectual Skills:	• **Abstraction**: students will have the ability to isolate essential features of complex systems, formulate problems mathematically and in symbolic form, so as to facilitate their analysis and solution. • **Logical reasoning**: students will be able to reason deductively and inductively. They will develop these skills by analyzing assumption-based models. This enhances graduates' problem-solving and decision-making ability. • Students will be able to structure and organize the world around them through key economic concepts and ideas, such as: opportunity cost, incentives, equilibrium, disequilibrium, stability, strategic behavior, expectations and surprises, marginal considerations, gains from trade and efficiency, dynamic systems. These concepts are present in most decision problems faced by economists.
• Professional Practical Skills:	• Students will be able to quantify economic effects using data, and will be able to organize and present data informatively. • Students will be able to frame economic and decision problems by focusing on what is essential. • Students will have strong numeracy skills developed by dealing with economic and financial data, which they can organize, manipulate, and interpret clearly. • Students will be able to design and conduct experimental and observational studies and analyse the data resulting from them. • Students will be able to formulate complex problems of optimization and interpret their solutions in the original context of the problems.
• Transferable/Key Skills:	• Graduates will have the ability to learn independently, using a variety of media including books, academic journals, online resources, etc. • Graduates will be able to work independently with patience and persistence, pursuing the solution of a problem to its conclusion. • Students will acquire time management and organization skills, and will also learn to work as part of a team. • Graduates will be able to transfer knowledge from one context to another, to assess problems logically and to approach them analytically. • Students will acquire general IT skills (word processing, basic principles of programming). • Students will have good communication skills (i.e. contribute to discussions, write coherently, communicate results clearly and intuitively). **Intended learning outcomes of placement year (4 year thick sandwich programme only):** **Transferable, work-related and employability skills:**

- communications skills, e.g. business/commercial/industrial report-writing skills, oral and poster presentation skills
- time management and the ability to prioritise effectively
- self-motivation, independence/autonomy
- adaptability
- team working, interpersonal and networking skills
- career planning, including occupational awareness and judgement, awareness of work-related personal values, interests and skills, application and selection process skills

Skills and competences specific to the role of mathematical economist:

- understanding that, in contrast to university problem sets, issues in the real world are often vaguely-defined and may not even have a possible solution
- an appreciation of the importance of attention to detail. Whereas in examinations it is common to receive partial credit for correct working regardless of answer, in the workplace this is not the case;
- an appreciation of the intricacies of dealing with real-world data. A full understanding of precisely how the data was generated and recorded is critical in order to be able to correctly deal with missing, erroneous and incoherent data entries.
- an understanding of the limitations of analytical and statistical techniques or the conditions under which such techniques are appropriate.

Higher skills:

- critical thinking and analysis
- problem solving
- computational skills
- project management skills
- original thinking, innovation
- enhanced self-knowledge

Changed personal attitude and behaviour:

- self-confidence, confidence in professional ability
- enhanced intellectual maturity and judgement
- enhanced levels of reflection, diplomacy, and understanding.

Summary of assessment and progression regulations

NFA - fully compliant

Progression Regulations and Awards

BSc Economics and Mathematics (BEM) 3 years full-time; or 4 years thick sandwich

The rules for progression from one stage to another and grading of assessed work and examinations conform to the University's framework for assessment and assessment regulations (NFAAR), see http://www.bath.ac.uk/registry/nfa/nfaar.pdf

The year-long work placement on the thick sandwich programme will be evaluated by a pass/fail-assessment.

The designated alternative programme is either the BSc Economics 3 years (full-time) or the BSc Economics 4 years (thick sandwich).

Details of Work Placements Requirements / Work Based Learning / Industrial Training Requirements

On the four-year long thick sandwich programme, the third year is spent in a public, commercial or civil society organisation. The placement serves to enable our students to apply first-hand the analytical and disciplinary skills conveyed in the joint Economics and Mathematics programme through institutional practice, thereby further enhancing their *understanding* of economics and mathematics and the *professional* role of economists and mathematicians.

Through the placement, students have the opportunity to deepen their skills in applied economics, mathematics and statistics and gain insight into economic policymaking; they will enhance further their proficiency in IT, teamwork, communication, presentation, time keeping and personal organisation. The placement also provides an excellent opportunity to investigate and assess potential career options prior to graduation.

The Department of Economics works with the Faculty of HSS Placements Office in identifying and generating the network from which placements can be developed. BEM placements will be managed by the HSS Faculty Placements Office. Where necessary the HSS placements team will liaise with the Faculty of Science placements team both in finding and supporting suitable placements. The placement will be evaluated by a **pass/fail-assessment** consisting of a written report on the placement work (2,000 words), an assessment by the visiting placement tutor, and an assessment by the employer. All students prepare a poster presentation of their placement on return to the University at the beginning of their final year.

Details of Study Abroad Requirements

Details of Professional Accreditation

Admissions Criteria including APL/APEL arrangements

Candidates must be able to satisfy the general admissions requirements of the University of

Bath and the Department of Economics. This will include:

- A-levels: Typical offer A*AA with A* required in A-level Maths.

  Double Maths: for applicants taking both A-level Maths and Further Maths a typical offer is A* in A-level Maths, A in A-level Further Maths and A in one further A-level subject. Economics is desirable but not essential.

  AS Further Maths: for applicants taking A-level Maths and AS Further Maths a typical offer is grade A* in A-level Maths, grades AA in two further A-level subjects and grade A in AS Further Maths plus at least 2/merit in one STEP/AEA Maths paper. Economics is desirable but not essential.

  Single Maths: for applicants taking A-level Maths, a typical offer is A* in Maths with As in each module, grades A* and A in two further A-level subjects plus at least 2/merit in one STEP/AEA Maths paper. Economics is desirable but not essential.

- International Baccalaureate: 39 points including 6 in higher level Maths (HLM) or 38 points with 7 in HLM.

- Applicants with other qualifications should contact the Admissions Office.

Applicants whose first language is not English should normally also achieve an IELTS score of 7 with not less than 6.5 in each of the four components.

Details of Support Available to Students

University of Bath students are usually encouraged to stay in University halls of residence during their first year and will be supported in their transition into University life and study by Resident Tutors. These are postgraduate students or staff who live in the halls of residence and are responsible for the general welfare, health and safety and discipline of student residents.

Staff in these roles will be able to respond to many of the questions and concerns raised by their students. However, there is also a range of specialist student support services that will offer both information and advice to support these staff working with their students, as well as take referrals to work more directly with the students. Students can also self-refer to these services.

These services can provide information, advice and support in relation to accommodation, emotional difficulties, assessment of needs and provision of support relating to disability, student funding, general welfare, academic problems, student discipline and complaints, careers, international students, spiritual matters, part time work, security and personal safety. The Students' Union can also provide advocacy for students. More information about these services can be accessed via: http://www.bath.ac.uk/students/support/.

There are also Medical and Dental Centres, and a Chaplaincy on campus that are very experienced in meeting the needs of a student population, as well as a University nursery and vacation play scheme to provide childcare for older children during the school holidays.

Department and Programme Specific Support Information

The Department provides a full programme of induction activities for Freshers which is carefully integrated with the offerings of the University and Students' Union. This provides both an orientation for academic life in the Department and several opportunities to meet fellow students and staff from Economics and also from Mathematical Sciences. This is backed up by an area on Moodle (the University's VLE) devoted to Freshers and the information they need to get settled in.

Students will be issued with a Student Handbook that contains detailed information about their academic programme of study, assessment and student support. They are able to access both the Economics and Maths Undergraduate zones on Moodle.

Students will be allocated a Personal Tutor in the Economics department who will work with a dedicated Director of Studies for BEM in addressing the particular academic needs and progress of joint honours students as well as matters of general welfare. Students on the programme will also be assigned a designated Course Tutor from Mathematical Sciences who will sit on the Department of Economics SSLC and who will guide them in their choices of optional modules and subject pathways in Mathematics. In particular, the course tutor will advise students on how different pathways and subject combinations (especially in Mathematics) may affect future placement and career opportunities, and will help students achieve a balanced choice of options across the two semesters of each academic year (especially in the final year which consists mostly of optional units). Also, as all other students affiliated with the Department of Mathematics, students on the BEM programme will be invited along to the Department of Mathematics presentations on optional units before being asked to make their unit choices.

Other Support for students on this programme will include:

- Study skills support (e.g. English Language tuition)
- Excellent library and IT facilities
- Sports and Arts facilities
- Proactive Students' Union
- http://www.bath.ac.uk/economics/
- http://www.bath.ac.uk/study/ug/prospectus/subject/economics