PROGRAMME SPECIFICATION

Bachelor of Science with Honours (SW) (Fnd) in Mathematics with Finance

Awarding institution	Liverpool John Moores University
Teaching institution	LJMU
UCAS Code	GN12
JACS Code	G100
Programme Duration	Full-Time: 4 Years, Sandwich Thick: 5 Years ,
Language of Programme	All LJMU programmes are delivered and assessed in English
Subject benchmark statement	Mathematics, Statistics & Operational Research (MSOR) 2015
Programme accredited by	Institute of Mathematics & its Applications
Description of accreditation	This programme will meet the educational requirements of the Chartered Mathematician designation, awarded by the Institute of Mathematics and its Applications, when it is followed by subsequent training and experience in employment to obtain equivalent competences to those specified by the Quality Assurance Agency (QAA) for taught masters degrees.
Validated target and alternative exit awards	Bachelor of Science with Honours (Fnd) in Mathematics with Finance Bachelor of Science with Honours (SW) (Fnd) in Mathematics with Finance Diploma of Higher Education (Fnd) in Mathematics with Finance Diploma in Higher Education (SW) (Fnd) in Mathematics with Finance Certificate of Higher Education (Fnd) in Mathematics with Finance
Programme Leader	Ian Malabar

Educational aims of the programme

This programme provides a solid grounding in how mathematics and statistics, supported by IT solutions, are applied to a wide variety of problems encountered in the financial sector, industry, business and research organisations. Hence it may be characterised as 'practice-based' (as referred to in the MSOR benchmark statement).

Its main aims are:

• to provide students with an opportunity to enhance their mathematical and statistical education by studying broad, yet integrated subjects which have application in finance, industry, business and research.

• to produce graduates with the mathematical and statistical knowledge to model, solve and analyse problems using the increasingly sophisticated quantitative techniques adopted by major commercial institutions.

• to provide students with the opportunity to acquire and develop the practical skills that are essential within a financial environment.

• the development in students of skills which can be utilised in unfamiliar situations, e.g. the ability to conjecture, justify and evaluate.

• to enhance students' key and transferable skills such as communication, applications of IT, working with others, improving their own learning, etc.

• to develop in students an awareness of knowledge and skills necessary for a career as a quantitative or financial analyst in the workplace.

• to produce graduates capable of progression to postgraduate areas of study in financial mathematics and in mathematical and statistical disciplines in general.

• to encourage students to engage with the development of employability skills by completing a self-awareness statement.

• for students undertaking a placement year the aim is to provide students with an extended period of work experience at an approved partner that will complement their programme of study at LJMU. This will give the students the opportunity to develop professional skills relevant to their programme of study, as well as attitude and behaviours necessary for employment in a diverse and changing environment.

Alternative Exit/ Interim Award Learning Outcomes - Certificate of Higher Education (Fnd)

A student who is eligible for this award will be able to:

Develop a thorough grounding in the basic mathematical concepts and methods needed to solve a range of problems with scientific, financial, business and statistical applications.

Appropriately use mathematical and other software to support conceptual understanding and problem solving.

Explore and analyse a set of data either 'by hand' or using statistical software, e.g. Minitab.

Develop the required background knowledge of probability and random variables so that they can make use of a number of formal statistical models in their analyses.

Apply the theoretical techniques of linear algebra in a practical context.

Formulate and solve a variety of real-world modelling problems.

Apply basic quantitative techniques that are relevant to business and finance.

Alternative Exit/ Interim Award Learning Outcomes - Diploma of Higher Education (Fnd)

A student who is eligible for this award will be able to:

Develop a thorough grounding in Mathematical methods in the areas of multidimensional calculus such as partial differentiation and applications, together with elements of discrete mathematics such as graph theory, linear programming, etc.

Use simple and multiple linear regression models and one-way and two-way Analysis of Variance models.

Apply probability distributions to tests of statistical inference.

Appreciate the importance of career management in terms of both personal and professional development.

Employ techniques of risk management through which they can assist decision makers in making informed decisions in the face of uncertainty

Develop mathematical skills in an independent manner.

Apply decision-making techniques in corporate, investment and international finance.

A student who successfully completes a placement year will be eligible for the Sandwich award and will, in addition to the above, be able to demonstrate the professional and personal skills necessary for effective employment within a professional environment.

Target award Learning Outcomes - Bachelor of Science with Honours (SW) (Fnd)

A student successfully completing the programme of study will have acquired the following subject knowledge and understanding as well as skills and other attributes.

A student who is eligible for this award will be able to:

1. Demonstrate their knowledge and understanding of a range of fundamental areas of mathematics, statistics

2. and finance.

3. Apply analytical techniques and algorithms to solve quantitative problems relating to finance, business and

4. commerce.

5. Use and apply a range of mathematical and statistical software to solve problems.

6. Identify the role of computers and I.T. in business and finance.

7. Apply decision-making techniques in the corporate environment with regard to investment appraisal, risk

8. management and financial structure.

9. Represent and explore relationships between algebraic, numerical and graphical forms of representation.

10. Model stochastic/deterministic systems in a financial context: conjecture, hypothesis, analysis, inference,
11. conclusion, interpretation, evaluation.
12. Apply appropriate problem-solving strategies and select appropriate tools.
13. Synthesise a balanced viewpoint from a variety of (potentially contradictory) evidence and perspectives.
14. Demonstrate the skills necessary to plan, undertake and report on a project of original research.
15. Critically evaluate, analyse and interpret complex technical data.
16. Model real world situations.
17. Use a wide range of appropriate software packages for the analysis/synthesis of information.
18. Communicate technical issues in non-technical language.
19. Plan and manage course/project work.
20. Present their work in a professional manner using appropriate I.T. and graphical software.
21. Employ decision-making techniques with regard to investment appraisal, financial structure and
22. risk-management decisions in a corporate context.
23. Use information technology, e.g. Internet, for effective information retrieval.
24. Apply problem solving skills.
25. Communicate effectively by written or verbal means.
26. Plan and manage learning and development.

Teaching, Learning and Assessment

The methods used to enable outcomes to be achieved and demonstrated are as follows:

Core knowledge and understanding is acquired via lectures, tutorials, practical computing sessions, team working and guided independent study. Independent study is used where appropriate resource material is available and increases as the programme progresses.

Assessment methods are specified in each module specification. All learning outcomes in a module are assessed and the type of assessment specified for each outcome. Each module is assessed by examination and/or course work (individual or group). The nature of the course work varies for each module.

Intellectual skills are developed and applied through class discussion, individual and group practical work, tutorials and course work assignments.

Intellectual skills are assessed via formal examinations and through course work assessment.

The final year project, involving a major report and oral presentation, allows a student to demonstrate his/her cognitive skills.

Practical skills are developed throughout the programme, and are reinforced in practical sessions at each level. The basic skills are provided at the lower levels. These are supplemented at higher levels by more advanced tools and techniques. Some of these skills are practised in the placement year.

Specialist software is available in School labs or from specified PCs in the libraries.

Assessment is normally by course work and formal, written, timed examination.

The placement year is assessed, by portfolio, on a pass / fail basis.

Key skills are developed throughout the programme in a variety of forms, specifically through a combination of research related coursework, guided independent study and projects, examinations, group work and presentations.

Programme structure - programme rules and modules

Students must select two option modules at Level 6. The choice of option modules could cause an imbalance in terms of credits across the year. The maximum imbalance would be 80:40. A balanced structure is clearly possible. Students can choose to have an imbalance of credits but they will be counselled carefully regarding the consequences in terms of the management of their work.

The placement year, module 5103APMATH, will follow Level 5 and students will be enrolled on a 600 credit honours sandwich programme. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5. Students successfully completing the assessment of the placement year are eligible for a

Sandwich award.

Students not undertaking a placement year are registered on the non-sandwich version of the programme and will have the opportunity of an additional study year abroad following Level 5. Students will be enrolled on a 480 credit honours with study abroad programme. Of those 600 credits, 120 will be taken via a Level 5 study abroad module 5107APMATH. The modules to be studied in the host institution must be agreed in advance. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5.

Level 6	Potential Awards on completion	Bachelor of Science with Honours (SW) (Fnd)
Core	Option	Award Requirements
6100MATHS PROJECT (40 credits) 6101MATHS OPERATIONAL RESEARCH (20 credits) 6106LBSBW International Corporate Finance (20 credits)	6006LBSAF Personal Finance (20 credits) 6007LBSAF International Finance (20 credits) 6105STATS STATISTICS IN THE WORKPLACE (20 credits) 6106STATS MULTIVARIATE ANALYSIS AND DATA MINING (20 credits) 6109COMP BUSINESS SYSTEMS ANALYSIS (20 credits) 6109MATHS ADVANCED CALCULUS (20 credits) 6111MATHS EXPERIMENTAL NUMBER THEORY (20 credits)	80 core credits at level 6 40 option credits at level 6

Level 5	Potential Awards on completion	
Core	Option	Award Requirements
5002LBSAF Financial Management (20 credits) 5100MATHS FURTHER MATHEMATICAL METHODS (20 credits) 5101STATS STATISTICAL MODELLING (20 credits) 5103STATS PROBABILITY AND RISK (20 credits) 5104MATHS PERSONAL AND PROFESSIONAL DEVELOPMENT (20 credits) 5105MATHS Differential Equations (20 credits)		120 core credits at level 5 0 option credits at level 5

Level 4	Potential Awards on completion	
Core	Option	Award Requirements
4001LBSAF Business Mathematics & Statistics (20 credits) 4100STATS DATA EXPLORATION AND ANALYSIS (20 credits) 4101MATHS MATHEMATICAL METHODS (20 credits) 4110MATHS LINEAR ALGEBRA (20 credits) 4111MATHS MODELLING 1 (20 credits) 4113MATHS MODELLING 2 (20 credits)		120 core credits at level 4 0 option credits at level 4

Level 3	Potential Awards on completion	
Core	Option	Award Requirements
3100FNDET Algorithms and Computing (10 credits) 3101FNDAPM Engineering and Technology Practice (20 credits)		120 core credits at level 3 0 option credits at level 3

3102FNDET Foundation Mathematics for Engineering and Technology 1 (20 credits) 3103FNDET Foundation Mathematics for Engineering and Technology 2 (20 credits) 3106FNDET Programming (10 credits) 3107FNDET Introductory Foundation Physics (20 credits) 3108FNDET Additional Foundation Physics (20 credits)		

Information about assessment regulations

All programmes leading to LJMU awards operate within the University's Academic Framework. https://www.ljmu.ac.uk/about-us/public-information/academic-quality-and-regulations/academic-framework

Opportunities for work-related learning (location and nature of activities)

5104MATHS Personal and Professional Development - This module provides students with an opportunity to consider their future role as an applied mathematician and develop a plan to enable them to progress in their chosen career.

5103APMATH Sandwich Year Mathematics with Finance - The aim is to provide students with an extended period of work experience at an approved partner that will complement their programme of study at LJMU. This will give students the opportunity to develop professional skills relevant to their programme of study as well as the attitude and behaviours necessary for employment in a diverse and changing environment.

6105STATS Statistics in the Workplace - This module aims to give students an experience of campus-based work related learning focusing on the role of a statistician in industry and how statistical methods are applied. Real projects derived from the work setting will be used as case studies to enable students to use their statistical knowledge and skills to solve real-world problems. Actual work-place data and constraints will be used to simulate work problems.

Criteria for admission

A/AS Level
Applicants should have or expect to obtain a total of 88 UCAS points with a maximum of 20 points from AS level qualifications.

BTEC National Diploma
BTEC Extended Diploma

To the value of 88 UCAS points.

BTEC Diploma / 90 Credit Diploma / Subsidiary Diploma /Certificate

To the value of 88 UCAS points when combined with other qualifications.

Irish Leaving Certificate
Applicants should have or expect to obtain a total of 88 UCAS points overall.

Scottish Higher
Applicants should have or expect to obtain a total of 88 UCAS points overall.

International Baccalaureate
Applicants should have or expect to obtain a total of 88 UCAS points overall.

Other
Qualifications deemed equivalent to the above upon completion of appropriate assessment will be considered acceptable.

Applicants should have five GCSE (or equivalent) passes of at least grade C including Mathematics and English (or IELTS 6.0).

Mature entry
Mature applicants will be considered on a case-by-case basis. The admissions team will be particularly

concerned with the length of time since any relevant academic study and relevant background from work

experience or 'Access' courses.

Admissions to the Foundation Year will follow the University Admissions policies on widening participation, equal opportunities, and students with disabilities.

Overseas qualifications
Applicants offering other awards will be considered on an individual basis in line with the agreed entry criteria.

All applicants should have achieved IELTS 6 or equivalent.

External Quality Benchmarks

All programmes leading to LJMU awards have been designed and approved in accordance with the UK Quality Code for Higher Education, including the Framework for Higher Education Qualifications in the UK (FHEQ) and subject benchmark statements where applicable.

The University is subject to periodic review of its quality and standards by the Quality Assurance Agency (QAA) Published review reports are available on the QAA website at www.qaa.ac.uk

Programmes which are professionally accredited are reviewed by professional, statutory and regulatory bodies (PSRBs) and such programmes must meet the competencies/standards of those PSRBs.

Support for students and their learning

The University aims to provide students with access to appropriate and timely information, support and guidance to ensure that they are able to benefit fully from their time at LJMU. All students are assigned a Personal Tutor to provide academic support and when necessary signpost students to the appropriate University support services.

Students are able to access a range of professional services including:

- Advice on practical aspects of study and how to use these opportunities to support and enhance their personal and academic development. This includes support for placements and careers guidance.
- Student Advice and Wellbeing Services provide students with advice, support and information, particularly in the areas of: student funding and financial matters, disability, advice and support to international students, study support, accommodation, health, wellbeing and counselling.
- Students studying for an LJMU award at a partner organisation will have access to local support services

Methods for evaluating and improving the quality and standards of teaching and learning

Student Feedback and Evaluation

The University uses the results of student feedback from internal and external student surveys (such as module evaluations, the NSS and PTES), module evaluation questionnaires and meetings with student representatives to improve the quality of programmes.

Staff development

The quality of teaching is assured through staff review and staff development in learning, teaching and assessment.

Internal Review

All programmes are reviewed annually and periodically, informed by a range of data and feedback, to ensure quality and standards of programmes and to make improvements to programmes.

External Examining

External examiners are appointed to programmes to assess whether:

- the University is maintaining the threshold academic standards set for awards in accordance with the FHEQ and applicable subject benchmark statements
- the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with University policies and regulations
- the academic standards are comparable with those in other UK higher education institutions of which external examiners have experience
- the achievement of students are comparable with those in other UK higher education institutions of which the external examiners have experience

and to provide informative comment and recommendations on:

- good practice and innovation relating to learning, teaching and assessment observed by external examiners
- opportunities to enhance the quality of the learning opportunities provided to students

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, teaching, learning and assessment methods of each module can be found in module and programme guides.