UNIVERSITY OF LIVERPOOL

BSc (Hons)

Applied Mathematics

UCAS code G121

Entry requirements	Study mode	Duration
A level: ABB	Full-time	3 years

Apply by: **29 January 2025**
Starts on: **22 September 2025**

About this course

Applied Mathematics at the University of Liverpool will teach you how to think differently about the world around us. You will engage with powerful mathematical concepts that will enhance your problem-solving and critical thinking skills, enabling you to understand complex phenomena across all aspects of the modern world, from physics to engineering, computer science, epidemiology, AI, and machine learning.

Introduction

Not only is Mathematics a fascinating, beautiful and diverse subject to study, but it also forms the foundation of all modern science. The concepts, methods, and philosophy of Mathematics is critical to understanding the world around us – whether that be climate change, epidemics, financial markets, or unravelling the mysteries of the universe.

Applied Mathematics degree from the University of Liverpool offers a powerful blend of theory and real-world problem solving, preparing you for a wide range of exciting careers. Whether you're interested in biology, engineering, finance, data science, environmental modelling, computer science, healthcare, or physics, this degree equips you with the mathematical tools and computational skills to tackle complex

challenges. You'll learn how to analyse data, optimize systems, and build models to predict outcomes in a diverse range of fields.

With a strong emphasis on practical applications, an Applied Mathematics degree opens doors to jobs that are in high demand and gives you the flexibility to innovate and make an impact in nearly every industry. Plus, the problem-solving abilities you develop will be invaluable no matter where your career takes you!

You will be taught in a friendly, supportive environment by exceptionally qualified staff, who have first-class reputations in teaching and research, covering a wide range of applications across all areas of science.

This programme also has the options of undertaking a year abroad and a year in industry.

What you'll learn

• The fundamental concepts in the core areas of mathematics including analysis, linear algebra, differential equations and statistics.
• How to think differently, reason clearly and critically, and to construct mathematical arguments.
• How to analyse a mathematical problem and select appropriate tools to solve it.
• How to construct and assess mathematical models for real-world problems and use these models to offer unique insights.
• How to communicate and present mathematical information and ideas clearly, both to specialists and non-specialist audiences – an essential skill in any future career.

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Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

Year one

In year one you will study eight compulsory modules, to learn the fundamentals of a range of mathematical topics

Modules

Compulsory modules	Credits
CALCULUS I (MATH101)	15
INTRODUCTION TO LINEAR ALGEBRA (MATH103)	15
INTRODUCTION TO STUDY AND RESEARCH IN MATHEMATICS (MATH107)	15
MATHEMATICAL IT SKILLS (MATH111)	15
CALCULUS II (MATH102)	15
INTRODUCTION TO STATISTICS USING R (MATH163)	15
NEWTONIAN MECHANICS (MATH122)	15
NUMBERS, GROUPS AND CODES (MATH142)	15

Programme details and modules listed are illustrative only and subject to change.

Year two

In year two you will continue to study a range of important mathematical topics in more depth. You will study some compulsory, and choose some optional, modules from the list below. Please note that we regularly review our teaching, so the choice of modules may change.

For students who did not study at XJTLU, modules MATH244 and MATH221 are compulsory, module MATH242 is optional, module MATH241 is not available. For students who did study at XJTLU, module MATH241 is compulsory, modules MATH244, MATH221 and MATH242 are not available.

Modules

Compulsory modules	Credits
VECTOR CALCULUS WITH APPLICATIONS IN FLUID MECHANICS (MATH225)	15
COMPLEX FUNCTIONS (MATH243)	15
LINEAR ALGEBRA AND GEOMETRY (MATH244)	15
STATISTICS AND PROBABILITY I (MATH253)	15
DIFFERENTIAL EQUATIONS (MATH221)	15
CLASSICAL MECHANICS (MATH228)	15
NUMERICAL METHODS FOR APPLIED MATHEMATICS (MATH226)	15

Optional modules	Credits
METRIC SPACES AND CALCULUS (MATH242)	15
COMMUTATIVE ALGEBRA (MATH247)	15
STATISTICS AND PROBABILITY II (MATH254)	15

Optional modules	Credits
FINANCIAL MATHEMATICS (MATH260)	15
OPERATIONAL RESEARCH (MATH269)	15
STEM EDUCATION AND COMMUNICATION (MATH291)	15

Programme details and modules listed are illustrative only and subject to change.

Year three

In year three, you will study five compulsory modules and choose one of the optional modules available. Please note that we regularly review our teaching, so the choice of modules may change.

Modules

Compulsory modules	Credits
FURTHER METHODS OF APPLIED MATHEMATICS (MATH323)	15
CARTESIAN TENSORS AND MATHEMATICAL MODELS OF SOLIDS AND VISCOUS FLUIDS (MATH324)	15
NUMERICAL METHODS FOR ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS (MATH336)	15
MATHEMATICS OF NETWORKS AND EPIDEMICS (MATH338)	15
MATHEMATICAL BIOLOGY (MATH335)	15

Optional modules	Credits
QUANTUM MECHANICS (MATH325)	15
RELATIVITY (MATH326)	15
NUMBER THEORY (MATH342)	15
GROUP THEORY (MATH343)	15
DIFFERENTIAL GEOMETRY (MATH349)	15
LINEAR STATISTICAL MODELS (MATH363)	15
PROFESSIONAL PROJECTS AND EMPLOYABILITY IN MATHEMATICS (MATH390)	15
MATHS SUMMER INDUSTRIAL RESEARCH PROJECT (MATH391)	15
GAME THEORY (MATH331)	15
COMBINATORICS (MATH344)	15
THE MAGIC OF COMPLEX NUMBERS: COMPLEX DYNAMICS, CHAOS AND THE MANDELBROT SET (MATH345)	15
TOPOLOGY (MATH346)	15
THEORY OF STATISTICAL INFERENCE (MATH361)	15
MEDICAL STATISTICS (MATH364)	15
MEASURE THEORY AND PROBABILITY (MATH365)	15
MATHEMATICAL RISK THEORY (MATH366)	15
NETWORKS IN THEORY AND PRACTICE (MATH367)	15

Optional modules	Credits
MORE IS DIFFERENT: STATISTICAL MECHANICS, THERMODYNAMICS, AND ALL THAT (MATH327)	15

Programme details and modules listed are illustrative only and subject to change.

Teaching and assessment

How you'll learn

You will be taught through a diverse blend of contemporary engaging teaching methods, including lectures, tutorials, practical classes, problem classes, workshops, independent study, and supervised project work.

The department of mathematical sciences offers a vibrant, stimulating, and supportive learning environment with highly motivated and exceptionally qualified staff, renowned for their world-leading research and teaching.

In year one, lectures are supplemented by a thorough system of small-group tutorials and computing work is carried out in supervised practical classes. Key study skills, presentation skills and group work start in first-year tutorials and are developed later in the programme. The emphasis in most modules is on the development of problem-solving and critical thinking skills, which are regarded very highly by employers.

How you're assessed

The main modes of assessment are examination and coursework. Most Maths modules are assessed by a two-and-a-half-hour examination at the end of the semester, in January or May, but many have an element of coursework assessment. This might be through homework, class tests, mini-project work or key skills exercises. You will be taught by internationally recognised experts within a friendly department.

Liverpool Hallmarks

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

The Liverpool Curriculum framework sets out our distinctive approach to education. Our teaching staff support our students to develop academic knowledge, skills, and

understanding alongside our **graduate attributes**:

- Digital fluency
- Confidence
- Global citizenship

Our curriculum is characterised by the three **Liverpool Hallmarks**:

- Research-connected teaching
- Active learning
- Authentic assessment

All this is underpinned by our core value of **inclusivity** and commitment to providing a curriculum that is accessible to all students.

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Careers and employability

A degree in applied mathematics provides access to an almost limitless range of rewarding career paths. As a graduate with an applied mathematics degree from the University of Liverpool, you'll have an extremely valuable set of analytical and critical thinking skills that employers value, enabling you to pursue careers in almost any field.

Graduates with an applied mathematics degree are in high demand across a broad spectrum of industries, thanks to their expertise in quantitative analysis, problem-solving, and mathematical modelling. Some of the key career paths include:

• Data Science and Analytics: Applied mathematics graduates are well-equipped to work as data scientists, data analysts, or business analysts. Their skills in statistical modelling, machine learning, and data interpretation are highly sought after in sectors like finance, healthcare, and tech.
• Engineering and Technology: Applied mathematics graduates can work in engineering roles, including systems engineering, computational modelling, and simulation. They may also contribute to software development, particularly in fields that require complex algorithms, like AI and cybersecurity.
• Operations Research and Logistics: Companies in manufacturing, transportation, and supply chain management often hire applied mathematics graduates to optimize processes, improve efficiency, and reduce costs. Roles include operations research analyst, supply chain planner, and logistics coordinator.
• Healthcare and Biostatistics: Applied mathematics is increasingly used in medical research, epidemiology, and healthcare analytics. Careers may include biostatistician, health data analyst, or mathematical modeler in disease forecasting.

The versatility of an applied mathematics degree allows graduates to enter nearly any sector that requires mathematical modelling, statistical analysis, and algorithmic problem-solving. The growing demand for data-driven decision making in today's world ensures that career prospects remain strong, with opportunities for advancement and specialization across fields.

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Fees and funding

Your tuition fees, funding your studies, and other costs to consider.

Tuition fees

UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)

Full-time place, per year - £9,535
Year in industry fee - £1,905
Year abroad fee - £1,430 (applies to year in China)

International fees

Full-time place, per year - £26,600
Year in industry fee - £1,905
Year abroad fee - £13,300 (applies to year in China)

The tuition fees shown are correct for 2025/26 entry. Please note that the year abroad fee also applies to the year in China.

Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. Learn more about paying for your studies.

Additional costs

Your tuition fee covers almost everything but you may have additional study costs to consider, such as books.

Find out more about the additional study costs that may apply to this course.

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Entry requirements

The qualifications and exam results you'll need to apply for this course.

A levels

ABB including Mathematics A level grade A.

Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **ABC** with **A** in the EPQ.

If you don't meet the entry requirements, you may be able to complete a foundation year which would allow you to progress to this course.

Available foundation years:

- Mathematical Sciences BSc (Hons) (Foundation, 4 year route with Carmel College) BSc (Hons)

T levels

T levels are not currently accepted.

GCSE

4/C in English and 4/C in Mathematics

Subject requirements

Applicants must have studied Mathematics at Level 3 within 2 years of the start date of their course.

For applicants from England: For science A levels that include the separately graded practical endorsement, a "Pass" is required.

BTEC Level 3 National Extended Diploma

D*DD in relevant diploma, when combined with A Level Mathematics grade A.

International Baccalaureate

33 including 6 in Higher Mathematics.

Irish Leaving Certificate

H1, H2, H2, H2, H3, H3 including Mathematics at H1.

Scottish Higher/Advanced Higher

Advanced Highers accepted at grades ABB including grade A in Mathematics.

Welsh Baccalaureate Advanced

Acceptable at grade B or above alongside AB at A level including grade A in Mathematics.

Access

Access - 45 Level 3 credits in graded units in a relevant Diploma, including 39 at Distinction and a further 6 with at least Merit. 15 Distinctions are required in Mathematics.

International qualifications

Select your country or region to view specific entry requirements.

If you hold a bachelor's degree or equivalent, but don't meet our entry requirements, you could be eligible for a Pre-Master's course. This is offered on campus at the University of Liverpool International College, in partnership with Kaplan International Pathways. It's a specialist preparation course for postgraduate study, and when you pass the Pre-Master's at the required level with good attendance, you're guaranteed entry to a University of Liverpool master's degree.

English language requirements

You'll need to demonstrate competence in the use of English language, unless you're from a majority English speaking country.

We accept a variety of international language tests and country-specific qualifications.

International applicants who do not meet the minimum required standard of English language can complete one of our Pre-Sessional English courses to achieve the required level.

IELTS

6.0 overall, with no component below 5.5

TOEFL iBT

78 overall, with minimum scores of listening 17, writing 17, reading 17 and speaking 19. TOEFL Home Edition not accepted.

Duolingo English Test

115 overall, with speaking, reading and writing not less than 105, and listening not below 100

Pearson PTE Academic

59 overall, with no component below 59

LanguageCert Academic

65 overall, with no skill below 60

Cambridge IGCSE First Language English 0500

Grade C overall, with a minimum of grade 2 in speaking and listening. Speaking and listening must be separately endorsed on the certificate.

Cambridge IGCSE First Language English 0990

Grade 4 overall, with Merit in speaking and listening

Cambridge IGCSE Second Language English 0510/0511

0510: Grade C overall, with a minimum of grade 2 in speaking. Speaking must be separately endorsed on the certificate. 0511: Grade C overall.

Cambridge IGCSE Second Language English 0993/0991

0993: Grade 5 overall, with a minimum of grade 2 in speaking. Speaking must be separately endorsed on the certificate. 0991: Grade 5 overall.

Cambridge ESOL Level 2/3 Advanced

169 overall, with no paper below 162

Pre-sessional English

Do you need to complete a Pre-sessional English course to meet the English language requirements for this course?

The length of Pre-sessional English course you'll need to take depends on your current level of English language ability.

Pre-sessional English in detail

If you don't meet our English language requirements, we can use your most recent IELTS score, or the equivalent score in selected other English language tests, to determine the length of Pre-sessional English course you require.

Use the table below to check the course length you're likely to require for your current English language ability and see whether the course is available on campus or online.

Your most recent IELTS score	Pre-sessional English course length	On campus or online
5.5 overall, with no component below 5.5	6 weeks	On campus
5.5 overall, with no component below 5.0	10 weeks	On campus and online options available
5.0 overall, with no component below 5.0	12 weeks	On campus and online options available

Your most recent IELTS score	Pre-sessional English course length	On campus or online
5.0 overall, with no component below 4.5	20 weeks	On campus
4.5 overall, with no component below 4.5	30 weeks	On campus
4.0 overall, with no component below 4.0	40 weeks	On campus

If you've completed an alternative English language test to IELTS, we may be able to use this to assess your English language ability and determine the Pre-sessional English course length you require.

Please see our guide to Pre-sessional English entry requirements for IELTS 6.0 overall, with no component below 5.5, for further details.

Alternative entry requirements

- If your qualification isn't listed here, or you're taking a combination of qualifications, contact us for advice
- Applications from mature students are welcome.

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