UNIVERSITY OF LIVERPOOL

MSc

# Mathematical Sciences

| Study mode | Duration |
| --- | --- |
| Full-time | 12 months |
| Part-time | 24 months |

Apply by: **11 September 2026**
Starts on: **28 September 2026**

## About this course

This programme offers you the opportunity to specialise in a broad range of areas across pure and applied mathematics and theoretical physics.

## Introduction

Mathematics is a beautiful and diverse subject. It underpins a wide range of disciplines, from physical sciences to social science, from biology to business and finance. The further your study of mathematics progresses, the more fascinating it becomes.

The University of Liverpool has a large Mathematical Sciences department with highly qualified staff, a first-class reputation in teaching and research, and a friendly, supportive environment. We use mixed approaches to teaching and assessment, taking the best from traditional lectures, tutorials and assignments, and modern methods such as interactive learning sessions, video content and online assessment. Our programmes are designed with the needs of employers in mind to give you a solid foundation from which you may take your career in whatever direction you choose.

Our Mathematical Sciences MSc programme allows students to specialise in a broad range of areas across pure and applied mathematics and theoretical physics. It includes project work worth 105 credits, helping students develop independent working and research skills, highly valued by employers and essential for gaining entry to PhD programmes.

## Who is this course for?

The programme is suitable for graduates in mathematics and closely related subjects, who are seeking the opportunity to further develop their understanding of the subject. It is available to both full-and part-time students.

## What you'll learn

Students can choose from a range of taught modules in the following areas:

- Advanced mathematical methods
- Algebraic geometry
- Dynamical systems
- Fundamental particle physics
- Mathematical biology
- Singularity theory
- Solid mechanics
- Stochastic analysis
- String theory
- Wave propagation and scattering.

The range of possibilities grows even wider when you reach the dissertation modules, as you then have the opportunity to work with one of the expert supervisors in our department, on the mathematical topic that interests you the most.

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# Course content

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

### Semester one

You will choose modules in semester one to make up 60 credits. Please note that a limited selection of optional modules may only run in alternate years.

## Modules

| Compulsory modules | Credits |
|---|---|
| LATEX AND MATHEMATICAL PROGRAMMING PROJECT (MATH549) | 15 |

| Optional modules | Credits |
|---|---|
| SINGULARITY THEORY OF DIFFERENTIABLE MAPPINGS (MATH455) | 15 |
| RIEMANN SURFACES (MATH445) | 15 |
| REPRESENTATION THEORY OF FINITE GROUPS (MATH442) | 15 |
| ADVANCED TOPICS IN MATHEMATICAL BIOLOGY (MATH426) | 15 |
| QUANTUM FIELD THEORY (MATH425) | 15 |
| LINEAR DIFFERENTIAL OPERATORS IN MATHEMATICAL PHYSICS (MATH421) | 15 |
| MANIFOLDS, HOMOLOGY AND MORSE THEORY (MATH410) | 15 |

| Optional modules | Credits |
|---|---|
| LINEAR STATISTICAL MODELS (MATH363) | 15 |
| APPLIED PROBABILITY (MATH362) | 15 |
| APPLIED STOCHASTIC MODELS (MATH360) | 15 |
| DIFFERENTIAL GEOMETRY (MATH349) | 15 |
| GROUP THEORY (MATH343) | 15 |
| NUMBER THEORY (MATH342) | 15 |
| MATHEMATICAL BIOLOGY (MATH335) | 15 |
| RELATIVITY (MATH326) | 15 |
| QUANTUM MECHANICS (MATH325) | 15 |
| CARTESIAN TENSORS AND MATHEMATICAL MODELS OF SOLIDS AND VISCOUS FLUIDS (MATH324) | 15 |
| FURTHER METHODS OF APPLIED MATHEMATICS (MATH323) | 15 |

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

### Semester two

You will choose modules in semester two to make up 60 credits. Please note that a limited selection of optional modules may only run in alternate years.

## Modules

| Optional modules | Credits |
| --- | --- |
| MATH552 - PRELIMINARY DISSERTATION (MATH552) | 30 |
| GALOIS THEORY (MATH449) | 15 |
| ALGEBRAIC GEOMETRY (MATH448) | 15 |
| GEOMETRY OF CONTINUED FRACTIONS (MATH447) | 15 |
| ELLIPTIC CURVES (MATH444) | 15 |
| ASYMPTOTIC METHODS FOR DIFFERENTIAL EQUATIONS (MATH433) | 15 |
| INTRODUCTION TO MODERN PARTICLE THEORY (MATH431) | 15 |
| WAVES, MATHEMATICAL MODELLING (MATH427) | 15 |
| INTRODUCTION TO STRING THEORY (MATH423) | 15 |
| STOCHASTIC THEORY AND METHODS IN DATA SCIENCE (MATH368) | 15 |
| NETWORKS IN THEORY AND PRACTICE (MATH367) | 15 |
| MATHEMATICAL RISK THEORY (MATH366) | 15 |
| MEDICAL STATISTICS (MATH364) | 15 |
| THEORY OF STATISTICAL INFERENCE (MATH361) | 15 |
| TOPOLOGY (MATH346) | 15 |
| THE MAGIC OF COMPLEX NUMBERS: COMPLEX DYNAMICS, CHAOS AND THE MANDELBROT SET (MATH345) | 15 |

| Optional modules | Credits |
|---|---|
| COMBINATORICS (MATH344) | 15 |
| MATHEMATICS OF NETWORKS AND EPIDEMICS (MATH338) | 15 |
| NUMERICAL METHODS FOR ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS (MATH336) | 15 |
| GAME THEORY (MATH331) | 15 |
| MORE IS DIFFERENT: STATISTICAL MECHANICS, THERMODYNAMICS, AND ALL THAT (MATH327) | 15 |

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

### Final project

Full-time students complete their final dissertation during the summer. Part-time students complete their final dissertation during the second semester and summer of their second year.

## Modules

| Compulsory modules | Credits |
|---|---|
| MAIN DISSERTATION (MATH554) | 60 |

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

### Teaching and assessment

## How you'll learn

We are proud of our record on teaching quality; our MSc consists of cutting edge mathematics modules delivered by world-leading experts. We use a range of teaching methods, including traditional lectures and tutorials, video content, interactive learning sessions and one-to-one project supervision. Opportunities for individual discussions are provided for every taught module, for example via online forums or staff office hours.

## How you're assessed

Each lectured module has an assessment scheme tailored to fit its syllabus. This might include a traditional written exam, class test, assignments, projects, group work, or online exercises with automatic marking and immediate feedback. The programme also includes dissertation modules assessed through independent project work.

## 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 mathematically-based degree opens up a wide range of career opportunities, including some of the most lucrative professions.

Recent graduates have moved into specialised jobs in finance (actuarial, banking, insurance), software development, teaching, drugs testing and defence work.

The MSc programme is a natural route into doctoral study in mathematics and related fields, and many of our graduates have progressed to PhD at Liverpool and at other universities across the world.

## Career support from day one to graduation and beyond

### Career planning

### From education to employment

### Networking events

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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 - £14,000
Part-time place, per year - £7,000

### International fees

Full-time place, per year - £32,000
Part-time place, per year - £16,000

Tuition fees are for the academic year 2026/27.

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

- You can pay your tuition fees in instalments.
- All or part of your tuition fees can be funded by external sponsorship.
- International applicants who accept an offer of a place will need to pay a tuition fee deposit.

If you're a UK national, or have settled status in the UK, you may be eligible to apply for a Postgraduate Loan worth up to £12,167 to help with course fees and living costs. **Learn more about paying for your studies**.

## Additional costs

We understand that budgeting for your time at university is important, and we want to make sure you understand any course-related costs that are not covered by your tuition fee. This could include buying a laptop, books, or stationery.

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.

### Postgraduate entry requirements

We accept a 2:2 honours degree from a UK university, or an equivalent academic qualification from a similar non-UK institution. This degree should be in Mathematics.

We also encourage applications from those with degrees in subjects where Mathematics is a major component, for example Physics and Engineering. In these circumstances, we may look for higher marks to offset the lower number of credits earned for Mathematics modules. Each application will be assessed on its own merits.

### 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, a Pre-Master's can help you gain a place. This specialist preparation course for postgraduate study is offered on campus at the **University of Liverpool International College**, in partnership with Kaplan International Pathways. Although there's no direct Pre-Master's route to this MSc, completing a Pre-Master's pathway can guarantee you a place on many other postgraduate courses at The University of Liverpool.

## 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**

6.5 overall, with no component below 6.0

**TOEFL iBT**

If you took a TOEFL test on or before 20 January 2026, you'll need 88 overall, with minimum scores of listening 19, writing 19, reading 19 and speaking 20. If you took a TOEFL test from 21 January 2026 onwards, when a new scoring system was introduced, you'll need 4.5 overall, with 4 or above in all components. TOEFL Home Edition not accepted.

**Duolingo English Test**

125 overall, with writing not less than 125, speaking and reading not less than 115, and listening not below 110. For academic year 2025/26 only, we will also accept the production, literacy, comprehension and conversation score set: 120 overall, with no component below 105.

**Pearson PTE Academic**

61 overall, with no component below 59

**LanguageCert Academic**

70 overall, with no skill below 65

**PSI Skills for English**

B2 Pass with Merit in all bands

**INDIA Standard XII**

National Curriculum (CBSE/ISC) - 75% and above in English. Accepted State Boards - 80% and above in English.

**WAEC**

C6 or above

# 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 |
|---|---|---|
| 6.0 overall, with writing at 6.0 and no component below 5.5 | 6 weeks | On campus or online |
| 5.5 overall, with writing at 5.5 and no component below 5.0 | 10 weeks | On campus or online |
| 5.5 overall, with no more than one component at 5.0 | 12 weeks | Online |
| 5.5 overall, with no component below 5.0 | 20 weeks | On campus |
| 5.0 overall, with no more than one component at 4.5 | 30 weeks | On campus |
| 4.5 overall, with no more than one component at 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 6.5 overall, with no component below 6.0, for further details.

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