UNIVERSITY OF LIVERPOOL

MSc

Advanced Data Science and Artificial Intelligence

Study mode	Duration	
Full-time	12 months	Apply by: **15 January 2027** Starts on: **25 January 2027**

About this course

Gain hands-on experience of big data analytics, data mining and visualisation techniques using high-performance computer technology.

Introduction

Please note, if you're applying for January 2027 entry, your course welcome starts on 25 January 2027. Teaching starts on the 1 February 2027.

Big data is increasingly important in the contemporary business and IT world. For many public and private enterprises, analysis of large-scale data sets is critical to growth.

This MSc will prepare you for employment in an IT industry where big data professionals are in high demand.

You'll learn how to interrogate vast amounts of structured and unstructured data and make informed insights from datasets that are too large to be readily processed using standard techniques.

We'll provide an overview of the key algorithms, algorithmic approaches and software environments you'll use when solving big data problems and explore data mining techniques.

Hands-on programming experience with the latest multi-core and multi-processor platforms will ensure your expertise in big data is underpinned by knowledge of high-performance computing. Further opportunities to specialise and enhance your knowledge of algorithms, optimisation and machine learning are available through a range of optional modules.

You'll work as part of a small group on a practical project to find a solution to a big data problem. We'll also provide a thorough grounding in how to plan and conduct research in preparation for your dissertation.

This course is available with a Year in Industry. Please note: the Year in Industry is only available to those starting in September.

Who is this course for?

The MSc in Advanced Data Science and Artificial Intelligence is designed for and directed at graduates with a previous Computer Science related degree.

Which postgraduate degree is right for you?
The Department of Computer Science offers master's programmes for students with undergraduate degrees in Computer Science and other disciplines.

If you have a Computer Science related degree, you could be eligible for the following master's courses:

- Advanced Computer Science MSc
- Advanced Computer Science with a Year in Industry MSc
- Advanced Data Science and Artificial Intelligence MSc
- Advanced Data Science and Artificial Intelligence with a Year in Industry MSc
- Theoretical Computer Science MSc
- Theoretical Computer Science with a Year in Industry MSc
- Cyber Security MSc.

Computer Science related degrees may include degree titles such as: Computer Applications, Computer Science, Computer Engineering, Computer Applications and Engineering, and Software Engineering. Please note that this list is not exhaustive.
Any Computer Science related degree should contain a significant amount of computer science related modules to be relevant (as assessed by the Department of Computer Science).

If you don’t have a Computer Science related degree and you are interested in learning more about the field, you may be eligible to study:

- Data Science and Artificial Intelligence MSc
- Data Science and Artificial Intelligence with a Year in Industry MSc
- Computer Science MSc
- Computer Science with a Year in Industry MSc
- Cyber Security MSc.

Please check individual course pages for detailed entry requirements.

What you'll learn

- Theoretical and practical aspects of programming for the latest multi-core and multi-processor platforms
- Key algorithms, approaches and software environments for developing solutions to big data problems
- Data mining techniques and challenges using real-world datasets
- Application of visualisation methods to data mining
- Research skills in computer science
- Bio-inspired algorithms for optimisation and machine learning
- How to model continuous and discrete optimisation problems
- The benefits and weaknesses of selected algorithmic techniques
- Algorithmic aspects of game theory
- Neural networks for artificial intelligence
- How to validate systems against safety specifications

Accreditation

The programme starting in September is accredited by BCS, The Chartered Institute for IT, for the purposes of partially meeting the academic requirement for registration as a Chartered IT Professional.

The programme starting in January is pending accreditation by BCS, The Chartered Institute for IT.

Accreditation in detail

BCS

The Chartered Institute for IT for the purposes of fully meeting the academic requirement for registration as a Chartered IT Professional.

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Course content

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

September start

The course is available to start in September or January. If you choose to start in September, you'll undertake taught modules from September to May. This will be followed by your MSc project over the summer.

In Semester one you'll study two compulsory taught modules and two optional taught modules.

In Semester two you'll study two compulsory taught modules and two optional taught modules.

Please note: the Year in Industry is only available to those starting in September.

Modules

Compulsory modules	Credits
RESEARCH METHODS IN COMPUTER SCIENCE (COMP516)	15
BIG DATA ANALYTICS (COMP529)	15
MSC GROUP PROJECT (COMP530)	15
DATA MINING AND VISUALISATION (COMP527)	15

Optional modules	Credits
EFFICIENT ALGORITHMS (COMP526)	15

Optional modules	Credits
MULTI-CORE AND MULTI-PROCESSOR PROGRAMMING (COMP528)	15
QUANTUM COMPUTING AND SECURITY (COMP535)	15
OPTIMISATION (COMP557)	15
ONTOLOGIES AND SEMANTIC WEB (COMP318)	15
SAFETY AND DEPENDABILITY (COMP524)	15
MACHINE LEARNING AND BIOINSPIRED OPTIMISATION (COMP532)	15
COMPUTATIONAL INTELLIGENCE (COMP575)	15
ALGORITHMIC GAME THEORY (COMP559)	15

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

January start

The course is available to start in September or January. If you choose to start in January, you'll undertake taught modules from January to May. This will be followed by your MSc project over the summer and then your final set of modules from September to January. On successful completion of the course, following a January start, you can expect to graduate at our summer graduation ceremonies.

In the first semester you'll study two compulsory taught modules.

In the final semester you'll study two taught compulsory modules and two taught optional modules.

Please note: the Year in Industry is only available to those starting in September.

Modules

Compulsory modules	Credits
RESEARCH METHODS IN COMPUTER SCIENCE (COMP616)	15
DATA MINING AND VISUALISATION (COMP527)	15
MSC GROUP PROJECT (COMP530)	15
BIG DATA ANALYTICS (COMP529)	15

Optional modules	Credits
MULTI-CORE AND MULTI-PROCESSOR PROGRAMMING (COMP528)	15
EFFICIENT ALGORITHMS (COMP526)	15
QUANTUM COMPUTING AND SECURITY (COMP535)	15
OPTIMISATION (COMP557)	15
ONTOLOGIES AND SEMANTIC WEB (COMP318)	15
SAFETY AND DEPENDABILITY (COMP524)	15
MACHINE LEARNING AND BIOINSPIRED OPTIMISATION (COMP532)	15
ALGORITHMIC GAME THEORY (COMP559)	15
COMPUTATIONAL INTELLIGENCE (COMP575)	15

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

Final project

Your final project, undertaken over the summer, will give you the opportunity to work independently to explore a substantial problem in depth, making practical use of principles, techniques and methodologies you have acquired during the programme.

You'll create a proposal, deliver a presentation with a Q&A, and submit a final dissertation.

Modules

Compulsory modules	Credits
MSC PROJECT (COMP702)	60

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

Teaching and assessment

How you'll learn

Teaching comprises formal lectures, small group tutorials and practical sessions in computer laboratories. You may also take part in one or more group projects. In addition, you complete an individual project under academic supervision.

How you're assessed

Taught modules are assessed through a combination of examinations and coursework. You'll sit examinations at the end of each semester, which are typically in-person written assessments, usually completed over 2 or 2.5 hours. You will complete coursework throughout the semester, typically class tests, programming assignments or small projects.

For your final project, you will create a proposal, deliver a presentation with a Q&A, and submit a final dissertation, all of which will be assessed.

Liverpool Learning Framework

At Liverpool, we take a distinctive approach to education through the Liverpool Learning Framework. This means teaching that is engaging, inclusive and designed to help you succeed during your studies and beyond.

You'll develop specialist subject knowledge alongside the skills employers value most, including:

- Digital fluency
- Confidence
- Global citizenship

Our curriculum is characterised by the three Liverpool Hallmarks:

- Research-connected teaching - learning informed by the latest ideas and discoveries
- Active learning - taking part, applying knowledge and learning by doing
- Authentic assessment - assessments designed around real-world tasks and challenges

We also embed key priorities across our curriculum, including AI literacy, employability, and sustainability, helping you prepare for the future and make a positive impact in the world.

We're committed to creating a supportive and inclusive learning environment where every student can thrive.

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Careers and employability

Designed to address a skills gap in the employment market, this MSc will enable you to apply your skills working with big data and your knowledge of high performance computing to real-world challenges.

Examples of relevant careers include, but are not limited to:

- Data analyst
- Data scientist
- Mathematical modeller
- Database administrator
- Machine learning engineer
- Statistician.

The transferable skills you develop will also prepare you for a variety of other roles across the IT industry, while your expertise working with data will mean you're well suited to potential PhD study.

In the UK, a machine learning engineer can expect a graduate entry level salary of £35,000.

With three to five years experience, this can rise to £50,000 to £80,0000.

At senior level or in a specialised or lead role, this can rise to £120,000.

source: Prospects, Sept 2024

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

International fees

Full-time place, per year - £34,000

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 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 £12,858 to help with course fees and living costs. **Learn more about paying for your studies**.

Additional costs

We don't anticipate additional compulsory costs to students outside of general study costs.

You can find information on the general and subject-specific costs you could expect to incur on our study costs webpage.

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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 computer science or a closely related subject.

International qualifications

Select your country or region to view specific entry requirements.

Many countries have a different education system to that of the UK, meaning your qualifications may not meet our entry requirements. Completing your Foundation Certificate, such as that offered by the University of Liverpool International College, means you're guaranteed a place on your chosen course.

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 5.5

TOEFL iBT

If you took a TOEFL test on or before 20 January 2026, you'll need 88 overall, with minimum scores of listening 17, writing 17, reading 17 and speaking 19. 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 speaking, reading and writing not less than 105, and listening not below 100. For academic year 2025/26 only, we will also accept the production, literacy, comprehension and conversation score set: 120 overall, with no component below 95.

Pearson PTE Academic

61 overall, with no component below 59

LanguageCert Academic

70 overall, with no skill below 60

PSI Skills for English

B2 Pass with Merit overall and no band below B2 Pass

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 no component below 5.5	6 weeks	On campus or online
5.5 overall, with no more than one component at 5.0	10 weeks	On campus or online
5.5 overall, with no component below 5.0	12 weeks	Online
5.0 overall, with no component below 5.0	20 weeks	On campus
5.0 overall, with no component below 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 5.5, for further details.

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