UNIVERSITY OF LIVERPOOL

MSc

Advanced Computer Science

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

About this course

Extend your knowledge of computer science on an MSc that will place you at the cutting edge of the discipline. The wide range of options on the programme will enable you to develop expertise in computer science research while tailoring your studies to your own interests.

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.

This programme will underpin and enhance your current knowledge and understanding; along with skills that you develop during the programme, it will provide you with a strong basis for your future career in the IT industry and towards specialisation in the field of Computer Science related research and development.

The programme is highly flexible, with one compulsory module that will develop the skills needed to conduct computer science research.

You'll choose the remaining topics from a variety of optional modules. You could opt to focus on practical algorithms and data mining techniques, discover biologically inspired optimisation, hone your expertise in advanced web technologies, or be introduced to neural networks for artificial intelligence.

Whether you're interested in technical and organisational discussions about cryptography and security or want to enhance your understanding of how maps can be visualised online, the number of options ensures you can tailor the programme to your individual needs.

You'll also have the opportunity to participate in a group project where you can work with your peers as part of a programming team to find a solution to a practical problem.

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?

Designed for graduates of the highest calibre, the MSc in Advanced Computer Science is directed at graduates with a previous Computer Science or IT 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

- Issues at the forefront of current computer science research
- How geographic information science and data science intersect
- Data mining techniques and challenges using real-world datasets
- How to design and analyse algorithms
- How images are generated, represented, compressed and processed
- Parallel programming for multi-core architectures
- Bio-inspired algorithms for optimisation and machine learning
- Neural networks for artificial intelligence
- Algorithmic aspects of game theory
- How to utilise advanced web technologies
- Key issues in privacy, security and cryptography.

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.

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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.

Your only compulsory taught module is Research Methods in Computer Science (COMP516). This module will help you learn and practice all the necessary skills needed to conduct independent research in computer science which you will need for further learning and your MSc project. You normally take optional taught modules worth 45 credits in the first semester and optional taught modules worth 60 credits in the second semester of your studies.

You can choose to focus on practical algorithms and data structures for large datasets, how the modern geographic information sciences toolkit can be integrated with Data Science tools to solve practical real-world problems, the fundamentals of how images are generated, represented, compressed and processed, parallel programming for multi-core architectures, optimisation methods, or privacy and security topics such as identification and authentication, monitoring protocols, attacks and defences, legal and ethical issues and future directions.

You'll also have the chance to participate in a group project where you can work with colleagues as a programming team to build on work from your first semester to find a solution to a relevant problem.

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

Optional modules	Credits
IMAGE PROCESSING (ELEC319)	7.5
KNOWLEDGE REPRESENTATION (COMP521)	15
PRIVACY AND SECURITY (COMP522)	15
EFFICIENT ALGORITHMS (COMP526)	15
MULTI-CORE AND MULTI-PROCESSOR PROGRAMMING (COMP528)	15
QUANTUM COMPUTING AND SECURITY (COMP535)	15
OPTIMISATION (COMP557)	15
GEOGRAPHIC DATA SCIENCE (ENVS563)	15
INFORMATION THEORY AND CODING (ELEC415)	7.5
MULTI-AGENT SYSTEMS (COMP310)	15
CLOUD COMPUTING FOR E-COMMERCE (COMP315)	15
ONTOLOGIES AND SEMANTIC WEB (COMP318)	15
ADVANCED ALGORITHMIC TECHNIQUES (COMP523)	15
SAFETY AND DEPENDABILITY (COMP524)	15
DATA MINING AND VISUALISATION (COMP527)	15
MSC GROUP PROJECT (COMP530)	15

Optional modules	Credits
MACHINE LEARNING AND BIOINSPIRED OPTIMISATION (COMP532)	15
ALGORITHMIC GAME THEORY (COMP559)	15
COMPUTATIONAL INTELLIGENCE (COMP575)	15
ADVANCED GEOVISUALISATION (ENVS456)	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.

Your only compulsory taught module is Research Methods in Computer Science (COMP516). This module will help you learn and practice all the necessary skills needed to conduct independent research in computer science which you will need for further learning and your MSc project. You normally take optional taught modules worth 45 credits in the first semester and optional taught modules worth 60 credits in the final semester of your studies.

You could dig into basic algorithmic methods for the design and analysis of algorithms, the algorithmic aspects of game theory, biologically inspired optimisation and introduction to neural networks for artificial intelligence, machine learning, data mining, source coding and error correcting, multi-agent systems, utilising advanced web technologies, use of logic as a tool for specifying the desired behaviour of hardware, software and artificial intelligence systems, game-theoretic discussions of auctions, technical and organisational discussions about cryptography and security, or gain an understanding of how maps can be visualised online.

You'll also have the chance to participate in a group project where you can work with colleagues as a programming team to build on work from your first semester to find a

solution to a relevant problem.

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

Optional modules	Credits
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INFORMATION THEORY AND CODING (ELEC415)	7.5
MULTI-AGENT SYSTEMS (COMP310)	15
CLOUD COMPUTING FOR E-COMMERCE (COMP315)	15
ONTOLOGIES AND SEMANTIC WEB (COMP318)	15
ADVANCED ALGORITHMIC TECHNIQUES (COMP523)	15
SAFETY AND DEPENDABILITY (COMP524)	15
DATA MINING AND VISUALISATION (COMP527)	15
MSC GROUP PROJECT (COMP530)	15
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ALGORITHMIC GAME THEORY (COMP559)	15

Optional modules	Credits
COMPUTATIONAL INTELLIGENCE (COMP575)	15
ADVANCED GEOVISUALISATION (ENVS456)	15
KNOWLEDGE REPRESENTATION (COMP521)	15
EFFICIENT ALGORITHMS (COMP526)	15
MULTI-CORE AND MULTI-PROCESSOR PROGRAMMING (COMP528)	15
QUANTUM COMPUTING AND SECURITY (COMP535)	15
OPTIMISATION (COMP557)	15
GEOGRAPHIC DATA SCIENCE (ENVS563)	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

Graduating in Advanced Computer Science will provide you with a basis for further career development towards senior technical and managerial positions in the IT industry, and towards specialisation in the field of Computer Science-related research and development. It also provides a strong foundation for potential PhD research.

In this way, the MSc programme offers multiple opportunities in the fast-changing IT industry. Examples of relevant careers include, but are not limited to:

- Database administrator
- Information systems manager
- Senior Software Engineer
- IT consultant
- Network engineer
- Systems designer.

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 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 £12,858 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, specialist equipment, or stationery.

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 65

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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