UNIVERSITY OF LIVERPOOL

MSc

Advanced Computer Science

Study mode	Duration	
Full-time	12 months	Apply by: **29 August 2025**
Part-time	24 months	Starts on: **22 September 2025**

About this course

This course aims to extend your knowledge gained during undergraduate study with more advanced specialised material reflecting current research at the “cutting-edge” of the discipline.

Introduction

This programme will underpin and enhance your current knowledge and understanding; along with skills that you develop during the programme, 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.

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.

What you'll learn

- A deep and systematic understanding of selected issues at the forefront of current research in the academic discipline of Computer Science
- A depth of knowledge of Computer Science to provide an effective basis for students to continue to a research degree either at The University of Liverpool or elsewhere
- A broad-based understanding of current research issues in Computer Science
- A comprehensive understanding of how established techniques of research and enquiry are used to extend, create and interpret knowledge in Computer Science and how that knowledge may be applied
- The opportunity to participate in current research
- An understanding of (research) project management and control.

Accreditation

The programme is accredited by the British Computer Society and is continually updated to reflect new technologies and trends.

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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

Your only compulsory module this semester 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 final projects.

You will then select at least three optional modules for the remainder of the semester. 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.

Students normally take 60 credits in each semester. However, if you opt to select the two 7.5 credit modules, you will have an uneven distribution of credits across the two semesters.

In exceptional circumstances, and with the approval of the programme Director of Studies, alternative modules available within the Computer Science provision may be substituted for optional modules.

Modules

Compulsory modules	Credits
RESEARCH METHODS IN COMPUTER SCIENCE (COMP516)	15

Optional modules	Credits
KNOWLEDGE REPRESENTATION (COMP521)	15

Optional modules	Credits
PRIVACY AND SECURITY (COMP522)	15
EFFICIENT ALGORITHMS (COMP526)	15
MULTI-CORE AND MULTI-PROCESSOR PROGRAMMING (COMP528)	15
GEOGRAPHIC DATA SCIENCE (ENVS563)	15
IMAGE PROCESSING (ELEC319)	7.5
OPTIMISATION (COMP557)	15
MSC GROUP PROJECT (COMP530)	15

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

Semester two

You have the chance to choose all of your modules during your second semester, giving you the opportunity to have a bespoke experience.

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.

Choose four optional modules.

Modules

Optional modules	Credits
ADVANCED ALGORITHMIC TECHNIQUES (COMP523)	15
SAFETY AND DEPENDABILITY (COMP524)	15
DATA MINING AND VISUALISATION (COMP527)	15
MULTI-AGENT SYSTEMS (COMP310)	15
CLOUD COMPUTING FOR E-COMMERCE (COMP315)	15
ONTOLOGIES AND SEMANTIC WEB (COMP318)	15
ALGORITHMIC GAME THEORY (COMP559)	15
INFORMATION THEORY AND CODING (ELEC415)	7.5
MACHINE LEARNING AND BIOINSPIRED OPTIMISATION (COMP532)	15
REASONING ABOUT ACTION AND CHANGE (COMP525)	15
WEB MAPPING AND GEOVISUALISATION (ENVS456)	15
COMPUTATIONAL INTELLIGENCE (COMP575)	15

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

Final project

Your final project 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 will create a proposal, a presentation, and 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

You will learn using a combination of formal lectures, small group tutorials and practical sessions in our state-of-the-art PC and Mac laboratories. Throughout the year, you will also take part in one or more group projects. At the end of the year, you will complete a large individual project.

As well as subjects in computer science, you will also develop general skills required for employability in industry or research including teamwork, presentation skills and research techniques.

How you're assessed

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

Lastly, you will submit a final dissertation assessed through a combination of written reports and a presentation of your achievements.

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

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.

Job titles and their definitions are not standardised within the IT industry and in a fast changing world employers demand maximum flexibility. However the following are some current options:

- Database administrator
- Information systems manager
- Applications developer
- 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 - £13,300
Part-time place, per year - £6,650

International fees

Full-time place, per year - £30,800
Part-time place, per year - £15,400

Fees stated are for the 2025-26 academic year.

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 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

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

Duolingo English Test

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

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
5.5 overall, with no component below 5.5	10 weeks	On campus and online options available
5.5 overall, with no more than one component below 5.5, and no component below 5.0	12 weeks	On campus and online options available
5.5 overall, with no component below 4.5	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 below 4.5, and 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 6.5 overall, with no component below 5.5, for further details.

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