

Course Information Sheet for entry in 2023-24: MSc in Advanced Computer Science



About the course

The MSc in Advanced Computer Science at Oxford has been designed to teach a range of advanced topics to graduates of computer science and other mathematical disciplines.

As in other branches of applied mathematics and engineering, improvements in the practice of programming require determined and meticulous application of methods of mathematical understanding, calculation and proof.

Recognising this, this full-time, twelve-month MSc has been designed to teach the mathematical principles of specification, design and efficient implementation of both software and hardware.

The MSc is designed to combine theory and practice. It teaches the advanced techniques and ideas that are being developed in application domains (such as machine learning, verification and computer security) and the rich and diverse theories that underpin them. These include models of computation and data, and mathematical analysis of programs and algorithms.

The course aims:

- to provide a foundation for research into the theory and practice of programming and the design of computer-based systems;
- to present knowledge, experience, reasoning methods and design and implementation techniques that are robust and forward-looking;
- to provide the foundation for a professional career in the computing-based industries, including telecommunications, process control, business-, mission-, and safety-critical fields; and
- to enhance the skills of a professional who is already working in one of these industries.

The Department of Computer Science is committed to the development and application of effective theory based on realistic practice, and some of the modules were developed through consultation and collaboration with industry. The department believes that only by the interplay of theory and practice can you be trained properly in such a rapidly advancing subject. Practice alerts us to real contemporary problems - theory is a shield against professional obsolescence.

Entrants to the course will come from either a computer science or mathematical background. You may be a recent graduate in computer science and will supplement your knowledge with the kind of sound mathematical basis which is not always found in undergraduate courses. If you are a graduate in mathematics you will apply your training in the context of a rigorous application of the fundamental techniques of computer science.

You will develop knowledge and understanding of a formal disciplined approach to computer science, a range of relevant concepts, tools and techniques, the principles underpinning these techniques and the ability to apply them in novel situations. On subsequent employment, you will be able to select techniques most appropriate to your working environment, adapt and improve them as necessary, establish appropriate design standards for both hardware and software, train colleagues and subordinates in the observance of sound practices, and keep abreast of research and development.

Course outline

The academic year is split into three terms of eight weeks but work on the MSc course continues throughout the year and is not restricted just to term time. During the three terms of the course, you will choose from modules on various aspects of computer science. Most modules will last for one term and will be between 16 to 24 lectures. In addition, all modules will have problem classes and some may also have practical sessions associated with them. In the third term (Trinity term) you will undertake a dissertation.

A typical week for a student taking three courses in each of the first two terms may be as follows:

- Lectures - eight hours
- Tutorial classes - three hours
- Practicals - four hours
- Self-directed study, including preparatory reading, problem sheets, revision of material - 20 hours

Total - 35 hours

The split of work may differ depending on whether a course has practicals associated. This should be taken as a guide only.

Examples of modules offered:

- Advanced Security
- Advanced Topics in Machine Learning
- Quantum Computer Science
- Categories, Proofs and Processes
- Computational Complexity
- Database Systems Implementation
- Computational Learning Theory
- Probabilistic Model Checking

Supervision

The allocation of graduate supervision for the course is the responsibility of the Department of Computer Science and it is not always possible to accommodate the preferences of incoming graduate students to work with a particular member of staff. Under exceptional circumstances a supervisor may be found outside the Department of Computer Science.

Assessment

For the taught modules, the mode of assessment shall be either written assignment or written examination, dependent on the module you are taking.

A dissertation, completed independently under the guidance of an expert supervisor, on a topic of your choice and approved by the supervisor and MSc Course Director will be submitted by the end of Trinity Term.

Changes to courses

The University will seek to deliver this course in accordance with the description set out above. However, there may be situations in which it is desirable or necessary for the University to make changes in course provision, either before or after registration. These may include significant changes made necessary by a pandemic (including Covid-19), epidemic or local health emergency. For further information, please see the University's Terms and Conditions (<http://www.graduate.ox.ac.uk/terms>) and our page on changes to courses (<http://www.graduate.ox.ac.uk/coursechanges>).

Expected length of course

| | Full Time Only |
|-----------------|----------------|
| Expected length | 12 months |

Costs

Annual fees for entry in 2023-24

| Fee status | Annual Course fees |
|------------|--------------------|
| Home | £14,410 |
| Overseas | £32,760 |

Information about course fees

Course fees are payable each year, for the duration of your fee liability (your fee liability is the length of time for which you are required to pay course fees). For courses lasting longer than one year, please be aware that fees will usually increase annually. Information about how much fees and other costs may increase is set out in the University's Terms and Conditions (<http://www.graduate.ox.ac.uk/terms>).

Course fees cover your teaching as well as other academic services and facilities provided to support your studies. Unless specified in the additional cost information (below), course fees do not cover your accommodation, residential costs or other living costs. They also don't cover any additional costs and charges that are outlined in the additional cost information.

Additional cost information

There are no compulsory elements of this course that entail additional costs beyond fees and living costs. However, as part of your course requirements, you may need to choose a dissertation, a project or a thesis topic. Please note that, depending on your choice of topic and the research required to complete it, you may incur additional expenses, such as travel expenses, research expenses, and field trips. You will need to meet these additional costs, although you may be able to apply for small grants from your department and/or college to help you cover some of these expenses.

Living costs

In addition to your course fees, you will need to ensure that you have adequate funds to support your living costs for the duration of your course.

The likely living costs for 2023-24 are published below. These costs are based on a single, full-time graduate student, with no dependants, living in Oxford. We provide the cost per month so you can multiply up by the number of months you expect to live in Oxford.

Likely living costs for one month

| | Lower range | Upper range |
|--------------------------|-------------|-------------|
| Food | £300 | £470 |
| Accommodation | £715 | £860 |
| Personal items | £180 | £305 |
| Social activities | £40 | £90 |
| Study costs | £35 | £80 |
| Other | £20 | £35 |
| Total | £1,290 | £1,840 |

Likely living costs for nine months

| | Lower range | Upper range |
|--------------------------|-------------|-------------|
| Food | £2,700 | £4,230 |
| Accommodation | £6,435 | £7,740 |
| Personal items | £1,620 | £2,745 |
| Social activities | £360 | £810 |
| Study costs | £315 | £720 |
| Other | £180 | £315 |
| Total | £11,610 | £16,560 |

Likely living costs for twelve months

| | Lower range | Upper range |
|--------------------------|-------------|-------------|
| Food | £3,600 | £5,640 |
| Accommodation | £8,580 | £10,320 |
| Personal items | £2,160 | £3,660 |
| Social activities | £480 | £1,080 |
| Study costs | £420 | £960 |
| Other | £240 | £420 |
| Total | £15,480 | £22,080 |

When planning your finances for any future years of study at Oxford beyond 2023-24, it is suggested that you allow for potential increases in living expenses of 5% or more each year – although this rate may vary significantly depending on how the national economic situation develops.

More information about how these figures have been calculated is available at www.graduate.ox.ac.uk/livingcosts.

Document accessibility

If you require an accessible version of the document please contact Graduate Admissions and Recruitment by email (graduate.admissions@admin.ox.ac.uk) or via the online form (<http://www.graduate.ox.ac.uk/ask>).