

Computer Science



NAME OF COURSE

Computer Science (+ Joint Honours: Maths & Computer Science, Computer Science & Philosophy)

LENGTH OF COURSE

3 Years (BA)
4 Years (MCompSci/
MMathComp/MCompPhil)

A-LEVELS REQUIRED

Maths, Further Maths (if your school offers it)

MINIMUM A-LEVEL GRADE REQUIREMENTS

A*AA (Computer Science, Computer Science & Philosophy)
A*AA (Maths & Computer Science)*

ADMISSIONS TEST

Maths Admissions Test (MAT):
- 10 multiple choice Maths questions (Q1)
- 2 long form Maths questions (Q2, Q5)

For CS and CS&P candidates
- 2 puzzle style questions (Q6, Q7)

For M&CS candidates
- 1 long form maths questions (Q3)
- 1 puzzle style question (Q6)

COURSE DESCRIPTION

The course is about understanding computer systems and networks at a deep level. It consists of different modules that can either be theoretical or applied. In addition to this, 1st year computer scientists must take a few mathematics modules. Theory modules use the mathematical approach to reason about abstract (i.e. not real) computer systems – to establish a set of facts and rules for dealing with that specific aspect of computing. Examples of this include Algorithms and Models of Computation. Applied modules teach you the practical aspect of, and the concepts underlying a lot of modern computer systems and practices. Examples include Functional Programming, and Concurrent Programming. This will give you a chance to build programs and gain practical skills required to build complex software. In addition, there is a group design practical in 2nd year, and research projects in 3rd and 4th year.

STRUCTURE OF MODULES

First year: 4 maths modules, 7 CS modules (mix of theory and applied), no optional modules

Second year: 4 mandatory CS modules, 4 optional modules (differs for joint honours)

Third year: 8 optional modules (can also include Maths modules)

Fourth year: Sit exams for 6 modules

Note: The structure for joint honours courses is slightly different to the above.

APPROXIMATE NO. OF CONTACT HOURS PER WEEK

Tutorials: 4 hours

Lectures: 8 hours

Labs: 4 hours

TUTORIAL TESTIMONIAL

Each module consists of a series of lectures (16-24), and a series of problem sheets (4-8), which contain problems relating to material in a few of the lectures. The problem sheets consist of around 10 questions that vary from basic application of concepts from lectures to very difficult questions that require a great deal of original thought. Tutorials are based around the problem sheets and are close one-on-one (or up to three on one) sessions where your tutors will review your work as well as answer questions, especially useful for the harder sections of the problem sheets.

LABS TESTIMONIAL

Many modules also feature programming labs, where you have a chance to learn the practical aspects of the course. These run in 2-hour sessions where you work through a lab booklet alongside others and with teaching assistants present. The labs themselves aren't assessed but must be completed.

PERSONAL STATEMENT TIPS

- Include as much relevant information to the course as you can. This includes any programming experience, books related to Computer Science or Maths that you've enjoyed or any topics that you're particularly interested in.
- They largely don't care too much about activities besides your academic ones or extra-curricular ones that aren't related to the course so I would recommend leaving that to a small paragraph.
- Finally, don't stress about it too much. The MAT and the interviews have much more weighting for the application process and so don't spend too much time (which could instead be spent doing problem solving) perfecting your personal statement.

INTERVIEW TIPS

- Tutors care more about how you arrived at the answer rather than the actual answer itself
- Explaining your thought process out loud is key. If you are not sure about a question, say what you know and where you think that information will take you. Try not to stay quiet and figure it out in silence as the tutors want to know what your thought process for approaching a question is
- Make sure you're well rested before the interview and don't worry if you can't answer some of the interview questions – the interviewers deliberately keep ramping up the difficulty of the questions that they ask until you can't answer
- Ensure you read through your personal statement before your interview as it is possible they might ask you about some aspect of these as a starting point

MAT TIPS

- Practice is the most important tip. Unlike exam content, problem solving isn't something you can cram quickly so instead doing short sessions consistently over a long period of time is a much better way to improve these skills. Try to look at a variety of types of questions using the resources below
- It's best to start with STEP papers as they are harder. The MAT papers are limited in number so leaving these to do last under timed conditions is much better. Thus, once you come to attempting the MAT papers, you will find them easier in comparison to STEP
- If you run out of time/are unsure of the answer, still write something down e.g. your thoughts, instead of leaving it blank

ONE THING I WISH I KNEW WHEN I WAS APPLYING

Precisely what the interviews would entail. They consist of the interviewers posing some quite difficult questions that could be described as puzzles. You're expected to reason about them in a precise, logical way and refine your final answer into something similar to a proof. For the style of question that they might ask, I recommend a book called *Algorithmic Puzzles* (author: Levitin)

EXAMPLE TIMETABLE

	Monday	Tuesday	Wednesday	Thursday	Friday
8 AM					
9 AM	Lectures	Lectures	Lectures	Lectures	Lectures
10 AM			10:00 AM		
11 AM	11:00 AM	11:00 AM	Lectures	11:00 AM	11:00 AM
12 PM			12:00 PM		11:30 AM
1 PM					Tutorial
2 PM	Tutorial	Labs		Labs	
3 PM	3:30 PM				
4 PM		Tutorial		4:00 PM	
5 PM		5:30 PM			

STUDYING & CAREERS

Besides the contact hours, most of your time will be spent reviewing lecture material and completing problem sheets. With the terms being very short and the pace of the material being covered, it can get quite busy at times. Deadlines tend to be quite clustered around the second half of the term and it's normal to find Week 5-Week 7 quite challenging. To manage the workload, it's critical to start early and plan ahead by doing work early when you know a busy period is coming.

A degree from Oxford is an excellent signal for landing job interviews and graduates are well known to have some of the highest average earnings of any degree in the UK, with the majority working as Software Engineers or closely related jobs.

RECOMMENDED READING/VIEWING

MAT/Interview Preparation

- brilliant.org (website - details problem solving and has a bank of problems, free version should be enough)
- [Dr Frost Maths](https://www.dr-frost-maths.com) (website - strategies & questions for MAT)
- [Algorithmic Puzzles](https://www.algorithmicpuzzles.com) by Anany Levitin and Maria Levitin (book for interview)
- [MAT Past Papers](https://www.mat-past-papers.com) (website)

Further Reading

- [The New Turing Omnibus](https://www.newturingomnibus.com) by A Kee Dewdney (book)
- [Code Academy](https://www.codecademy.com) (website - coding for beginners, Python may be best to start with)
- [Project Euler](https://projecteuler.net) (website - fun mathematical programming puzzles)
- [Hacker News](https://www.hackernews.com) (website - fun but relevant news site to see what's hot in the world of programming and technology)