DEPARTMENT OF
COMPUTER SCIENCE

UNDERGRADUATE COURSE HANDBOOK

PART C

For students entering the fourth year of their course in 2023

Computer Science
Computer Science & Philosophy
Mathematics & Computer Science

2023

Version 1

Welcome

This is a supplement to the Computer Science Handbook. It is designed to give you all the course-specific information you will need in your fourth year, complete with all important deadlines.

Please don't hesitate to get in touch with one of the academic admin staff at academic.administrator@cs.ox.ac.uk if you have any questions.

Contents

Disclaimer

This handbook supplement applies to students entering the fourth year of their degree in Computer Science, Mathematics & Computer Science or Computer Science & Philosophy in Michaelmas Term 2023. The information in this handbook may be different for students starting their fourth year in other years.

The Examination Regulations relating to this course will be available online at

Honour School of Computer Science

Honour School of Mathematics and Computer Science

Honour School of Computer Science and Philosophy

If there is a conflict between information in this handbook and the Examination Regulations then you should follow the Examination Regulations. If you have any concerns please contact the academic admin team at academic.administrator@cs.ox.ac.uk.

The information in this handbook is accurate as at October 2023. It may be necessary for changes to be made in certain circumstances, as explained at www.ox.ac.uk/coursechanges webpage. If such changes are made the department will publish a new version of this handbook, together with a list of the changes, and you will be informed.

Version	Action	Date
Version 1.0	Published start of MT23	

1 Courses

Please find information on Course Aims and Intended Learning Outcomes for each degree in the Undergraduate Course Handbook for the Preliminary Examinations.

For all undergraduate courses, you will have been entered initially for the 4-year degree. Please be aware that, to proceed into Part C, you will need to have a 2:1 or higher in Parts A and B together. If you change your mind during your fourth year, and decide that you no longer want to pursue the masters level, and would rather take the BA, please discuss this with your tutor, then contact your College Office, who will assist in organising the relevant forms.

Please note that the Computer Science courses in Part C are 50% bigger than those in earlier years, i.e. while you were expected to study for each 3rd year course for about 10 hours per week, you will now be required to invest about 15 hours of study a week for each course. Computer Science lecturers expect you to complete this extra work in a variety of ways, e.g. some will give 16 lectures but will require you to undertake extra reading, classes and/or practicals, whereas others will be giving 24 lectures, and others still will be doing something in between. Please look at each synopsis for details.

Please find information on the Computer Science Project on the departmental website.

1.1 Computer Science

The Department of Computer Science offers the following degree in Computer Science at undergraduate level:

- MCompSci Computer Science, 4-year

In the fourth year of Computer Science you are required to take five courses and complete a Computer Science project. The courses are chosen from a schedule called C1, which is published at http://www.cs.ox.ac.uk/teaching/bacompsci/PartC/.

1.2 Mathematics & Computer Science

The Department of Computer Science offers the following joint degree with the Department of Mathematics:

- MMathCompSci Mathematics and Computer Science, 4-year

In the fourth year of Mathematics and Computer Science you are required to complete either five courses and a Computer Science project or six courses and a Mathematics dissertation. The courses are chosen from Schedule C1 and Schedule C2. There is no restriction on the number of courses chosen from each schedule, except that if you choose to submit a Mathematics dissertation, you must also choose at least two other Mathematics courses.

Details on Mathematics courses currently offered to fourth year students can be found here.

You can find out more about the Mathematics dissertation here.

1.3 Computer Science and Philosophy

The Department of Computer Science offers the following joint degree with the Faculty of Philosophy:

- MCompSciPhil Computer Science and Philosophy, 4-year

In the fourth year of Computer Science and Philosophy, you must complete between 24 and 26 units; the unit values of the different options are as follows:

- each Philosophy paper or thesis is worth 8 units;
- each Computer Science taught course is worth 3 units;
- a Computer Science project is worth 9 units.

Choices are subject to the following constraints:

- you may take at most six Computer Science taught courses;
- you may not take both a Philosophy thesis and a Computer Science project.

The effect of these rules is that you should take one of the following combinations:

- three Philosophy papers (maybe including a thesis) (24 units);
- two Philosophy papers (maybe including a thesis) and either three CS courses or a CS project (25 units);
- one Philosophy paper (or thesis), and six CS courses (26 units);
- one Philosophy paper, three CS courses and a CS project (26 units);
- five CS courses and a CS project (24 units).

Computer Science courses are chosen from Schedule C1.

Philosophy options can be chosen from any courses of 101-120, 122, 124, 125, 127-129, 137-139, 198 and 199 as described on the Philosophy Faculty Website which you have not offered in Part B. With the exception of 198 and 199, each Philosophy course will be assessed by a 3-hour written examination together with an essay of at most 5,000 words. The special subject paper 198 is examined in different ways according to the special subject, and the method of assessment will specify when the special subjects available for your year are advertised. 199 is the Philosophy thesis. More information about the format of the written exams will be issued later in the year.

The full listings of Philosophy courses available to Computer Science and Philosophy students can be found here.

Rules for Philosophy theses in Part C are described in the Examination Regulations except that the word limit is 20,000 words.

2 Examinations for Part C

Exam Entry

Although you will be taking examinations at the end of each term, you will be entering for these exams via Student Self Service by Thursday of Week 2, Hilary term. You must make sure you enter for the examinations that you took in Michaelmas term.

For assessments with submissions i.e. mini-projects, entering for and changing options comes with more restrictions than written examinations. Option changes cannot occur for mini-projects after the exam entry deadline (for Michaelmas Term courses) or the submission deadline (for Hilary Term courses).

For example:
A student submits mini-projects for Quantum Processes and Computation and Computational Biology in Michaelmas Term by the deadline. In Hilary Term, the student completes exam entry (a formal process required by the University which is explained in more detail here) for Computational Biology, Geometric Deep Learning, and Database Systems Implementation, and decides to also enter for Quantum Software (rather than Quantum Processes and Computation). They submit the mini-projects for these courses by the deadline. During Hilary Term, the student receives provisional marks for Computational Biology, but not Quantum Processes and Computation (as they did not enter for this assessment). The student then decides that they would like the mark for Quantum Processes and Computation to be counted towards their final classification.

This is not possible under the University's Regulations.

Please ensure that you complete exam entry for all the courses you have taken in Michaelmas Term. If you have submitted work for a course, it **must** be included in your exam entry.

Approved Subjects

You may, with the approval from your tutor, wish to take an "approved" course not offered by the Department of Computer Science. Some undergraduate students are interested in taking courses offered by other departments, primarily the Department of Statistics or the Mathematical Institute, that are not on the usual schedule of courses for students in Computer Science. In this case, you must agree with your tutor any courses that you wish to take, and both you and your tutor should write to the Academic Admin team. The Undergraduate Supervisory Committee will then consider the request and, if the Committee approves the request, the student will be told to contact the other department and given instructions on completing exam entry for the course(s).

Mini-projects

The majority of courses at Part C are assessed through a mini-project. This is a written take-home assignment which will be released on Friday of week 8 of the term in which the course is taught. The mini-project will be due at the start of the following term. More details, and the submission deadlines, can be found in Section 3 of this Handbook. The mini-project will be designed to be completed in about three days. It will include some questions that are more open-ended than those on a standard sit-down exam. The work you submit must be your own work, and include suitable references.

Written Examinations

Some courses are assessed through a three-hour written examination in Trinity Term. For these courses, there are often three questions and you should answer all questions. Each paper has 100 marks available in total. The marks for each part of each question will be indicated on the examination paper.

The courses that are assessed by a written paper are Computational Game Theory, Computer Vision, Probabilistic Model Checking, Probability and Computing, and Knowledge Representation and Reasoning.

To pass the course, you must have a passing average overall. You do not need to pass all the courses you take, but the average across all taught courses must be over the pass mark. You must also pass the project, dissertation or thesis.

Further details are available in the exam conventions here: https://www.cs.ox.ac.uk/teaching/examinations/

2.1 Computer Science

At Part C you will be examined on five courses from Schedule C1 and a Computer Science project. Computer Science courses are either assessed by written paper or mini-project.

2.2 Mathematics & Computer Science

At Part C you will be examined in either five courses and a Computer Science project or six courses and a Mathematics dissertation. The courses are chosen from Schedule C1 and Schedule C2. There is no restriction on the number of courses chosen from each schedule, except that if you choose to submit a Mathematics dissertation, you must also choose at least two other Mathematics courses.

Computer Science courses are either assessed by written paper or mini-project.

For Mathematics, courses which are examined by a written paper will be confirmed by the Mathematics Institute. Each paper will examine one unit.

All mini-projects have a weighting of one unit.

2.3 Computer Science and Philosophy

For Part C you will be examined in Computer Science and Philosophy courses as described in section 1.3. Computer Science courses are chosen from Schedule C1. Philosophy courses are chosen from courses 101-120, 122, 124, 125, 127-129, 137-139 and 198, as described on the Philosophy Faculty Website.

Computer Science courses are either assessed by written paper or mini-project.

Each Philosophy course will be assessed by a 3-hour written examination together with an essay of at most 5,000 words.

Rules for Philosophy theses are described in the Examination Regulations except that the word limit is 20,000 words. More advice on Philosophy essays and theses will be issued later in the year.

3 Computer Science Mini-Projects

Computer Science mini-projects will be released at noon on the last Friday of the term in which the subject is being taught. This information will be included in the Notice to Candidates sent out each term.

Mini-projects will be released via Inspera and must be uploaded to Inspera by noon on the date specified below. The mini-project will be designed to be completed in about three days. It will include some questions that are more open-ended than those in a standard sit-down exam. The work you submit must be entirely your own work. If you make use of material from web-sites, books, articles or other sources you must acknowledge these and give suitable references. **Please see the University guidance on avoiding plagiarism.**

Michaelmas Term 2023

Course
Computational Biology
Computational Learning Theory
Concurrent Algorithms and Data Structures
Distributed Processes, Types and Programming
Graph Representation Learning
Quantum Processes and Computation

The submission deadline for the all mini-projects listed above is **12pm on Wednesday, 3rd January 2024.**

Hilary Term 2023

Course
Advanced Security
Algorithmic Foundations of Collective Decision Making
Categories, Proofs and Processes
Computational Medicine
Database Systems Implementation
Foundations of Self-Programming Agents
Geometric Deep Learning
Law and Computer Science
Quantum Software
Uncertainty in Deep Learning

The submission deadline for the all mini-projects listed above is **12pm on Wednesday 10th April 2024.**

Course
SC8 Topics in Computational Biology

The submission deadline for the mini-project listed above is **12pm on Monday 29th April 2024.**

4 Important Dates

4.1 Dates of term 2023-24:

Michaelmas term: Sunday 8th October 2023 – Saturday 2nd December 2023
Hilary term: Sunday 14th January 2024 – Saturday 9th March 2024
Trinity term: Sunday 21st April 2024 – Saturday 15th June 2024

Dates of Full Term for future years are available on the University's website.

4.2 Hand-In Dates – Mini-projects, Practicals and Project Reports

Michaelmas Term mini-projects
By noon on Wednesday of week -1, Hilary term (to Inspera)

Hilary Term mini-projects
By noon on Wednesday of week -1, Trinity term (to Inspera)

4th Year Computer Science Project Report
By noon on Monday of week 4, Trinity term (to Inspera).

Practicals reports
By noon on Friday of week 5, Trinity term (to Inspera)

5 What next?

5.1 Higher degrees

Many of our graduates go on to do a higher degree – a PhD or DPhil – at Oxford or elsewhere; perhaps that interests you.

If you expect to get a Distinction in Part C you may be interested in doing a DPhil. It is important that you realise that a DPhil is not awarded simply for three years of programming. Whilst being adept at programming, you should also have a strong command of the theory and the relationship between the two. As an undergraduate you should have attempted not just the routine tutorial problems, but have demonstrated some creativity and ability to solve harder problems. You should have a critical outlook with strong motivation and independence of thought, and above all a desire to reflect on what you have produced, incorporating the result of your reflection into your work. Typically, you should hope to produce a thesis which makes some novel theoretical contribution and shows how it can be usefully applied.
Talk to DPhil students in the department; discuss the prospect with your tutor if you think you might be interested.

It is worth talking to potential supervisors early (ideally before the end of your penultimate year). This might give them time to find money to fund you!

To apply: the University of Oxford has published a very useful application guide. Applications are made online. You will need two or three references; it is usual to choose tutors, project supervisors and college lecturers.

The admission deadline for entry in 2024-25 is **Friday 1 December 2023**.

If you have questions about graduate study in the Department of Computer Science please pop in and see a member of the graduate team or email graduate.admissions@cs.ox.ac.uk

5.2 Careers

Information about careers is provided by Oxford University Careers Service, 56 Banbury Road. The Careers Service organise many events to help you choose a career that suits you, and to put you in touch with recruiters. Their web site is at: www.careers.ox.ac.uk.

You are urged to contact the Careers Service for detailed information on careers, and also for advice on compiling a CV, on how to apply, and on interview technique.
When we receive information about careers suitable for Computer Science graduates, circulated by email. Information on job vacancies (together with summer internships and competitions) can also be found on our web site at https://www.cs.ox.ac.uk/recruiters/internal/vacancies.html (NB this site can only be accessed from within the Oxford domain).

6 Recommended Patterns of Teaching

Please compare the list of courses on the Departmental Website. If in doubt, please refer to the website.

6.1 Computer Science

4th Year Course structure: Five courses from Schedule C1 plus a Computer Science project					
Paper	**Term**	**Lectures**	**Classes**	**Practicals**	**Comments**
Computational Biology	MT	20			
Computational Game Theory	MT	20	4		
Computational Learning Theory	MT	24	4		
Concurrent Algorithms and Data Structures	MT	20	4	Y	
Distributed Processes, Types and Programming	MT	20		Y	
Graph Representation Learning	MT	20		Y	
Law and Computer Science	MT/HT	16/16	2.5	Y	
Probabilistic Model Checking	MT	20	4	Y	
Probability and Computing	MT	20	4		
Quantum Processes and Computation	MT	24	4		
Advanced Security	HT	22	4	Y	
Algorithmic Foundations of Collective Decision Making	HT	20	4		
Axiomatic Set Theory (C1.4)	HT	16			Taught by the Mathematical Institute
Categories, Proofs and Processes	HT	20			

Computational Medicine	HT	20	4		
Computer Vision	HT	21		Y	
Database Systems Implementation	HT	22	4	Y	
Foundations of Self-Programming Agents	HT	20			
Geometric Deep Learning	HT	18		Y	
Godel's Incompleteness Theorem (C1.2)	HT	16			Taught by the Mathematical Institute
Knowledge Representation and Reasoning	HT	24	6		
Quantum Software	HT	24			
SC8 Topics in Computational Biology	HT	16			Taught by the Department of Statistics
Uncertainty in Deep Learning	HT	20		Y	
Notes: - Students are also required to undertake a Computer Science Project in the 4th year which is expected to take about a third of the year.					

6.2 Mathematics and Computer Science

Maths and Computer Science Part C students are required to take either six option units from Schedule C1 and Schedule C2 and a Mathematics Dissertation or five option courses and a Computer Science Project. Schedule C1 will contain Computer Science options and Schedule C2 will contain Mathematics options.

Paper	Term	Lectures	Classes	Practicals	Comments
Computational Biology	MT	20			
Computational Game Theory	MT	20	4		
Computational Game Theory	MT	20	4		
Computational Learning Theory	MT	24	4		
Concurrent Algorithms and Data Structures	MT	20	4	Y	
Distributed Processes, Types and Programming	MT	20		Y	
Graph Representation Learning	MT	20		Y	
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Advanced Security	HT	22	4	Y	
Algorithmic Foundations of Collective Decision Making	HT	20			
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Computational Medicine	HT	20			
Computer Vision	HT	21		Y	
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Geometric Deep Learning	HT	18		Y	
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Quantum Software	HT	24			
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Uncertainty in Deep Learning	HT	20		Y	
Notes: - Students are also required to undertake a Computer Science Project or a Mathematics dissertation in the 4th year which is expected to take about a third of the year.					

6.3 Computer Science and Philosophy

In the fourth year of Computer Science and Philosophy, you must complete between 24 and 26 units; the unit values of the different options are as follows:

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Quantum Software	HT	24			
SC8 Topics in Computational Biology	HT	16			Taught by the Department of Statistics
Uncertainty in Deep Learning	HT	20		Y	

Notes:

- Students have the option to undertake a Computer Science Project or a Philosophy Thesis in the 4th year which is expected to take about a third of the year.