DEPARTMENT OF
COMPUTER SCIENCE

UNIVERSITY OF OXFORD

UNDERGRADUATE COURSE HANDBOOK

PARTS A & B

For students entering the second year of their course in 2023/24

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 second and third years, 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 second 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 second 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 must 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	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, and will need to decide in your third year whether you wish to carry on into the fourth year or leave at the end of the third year with a BA. Discuss this with your College Tutor, and inform your College's Academic Office.

To proceed into the fourth year (Part C), you will need to have an average of 2:1 or higher in Parts A and B together. If your average for Parts A and B together is 2:2 or below, you will **not be permitted** to proceed to Part C.

Please note that each course in Computer Science will require about 10 hours of study a week.

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).

1.1 Computer Science

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

- BA Computer Science, 3-year
- MCompSci Computer Science, 4-year

1.1.1 Second and third years

Synopses for all courses can be found at www.cs.ox.ac.uk/teaching/courses/.

Second-year Computer Science candidates will take four core courses and four option courses from Schedules A1 and A2. You will also complete the Group Design Practical.

The four core courses are:

- Compilers
- Concurrent Programming
- Algorithms and Data Structures
- Models of Computation

The list of courses in Schedules A1 and A2 can be found at www.cs.ox.ac.uk/teaching/bacompsci/PartA/.

These eight courses will be examined at the end of your second year.

Third-year Computer Science candidates will:

- take a total of six option courses from Schedules B1 and B2 (with no more than two from Schedule B2) and a project report (the third-year project counts as two courses);
- or take a total of eight option courses from Schedules B1 and B2 (with no more than two from Schedule B2).

To find out more about the project, please read the information here.

You will not be able to offer an option subject in Part B that you have already offered in Part A of the examination. The list of courses in Schedules B1 and B2 can be found at https://www.cs.ox.ac.uk/teaching/bacompsci/PartB/.

These courses will be examined at the end of your third year.

1.2   Mathematics & Computer Science

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

- BA Mathematics and Computer Science, 3-year
- MMathCompSci Mathematics and Computer Science, 4-year

1.2.1   Second and Third years

Second year Mathematics and Computer Science students take the following Maths papers:

- A0 Linear Algebra
- A2 Metric Spaces and Complex Analysis

In addition, you must offer either two papers from A3-A5, A7-A11 or one paper from A3-A5, A7-A11 and paper ASO. Details of these courses can be found here: https://courses.maths.ox.ac.uk/course/index.php?categoryid=741

You must also take the two core Computer Science courses:

- Algorithms and Data Structures
- Models of Computation

You will also take the Group Design Practical

In addition, you must offer two option courses from Schedules A1(M&CS) and A2(M&CS). A list of courses on this schedules can be found here: https://www.cs.ox.ac.uk/teaching/mcs/PartA/

These courses will be examined at the end of the second year.

It is particularly important to choose courses in your second year that will lead on to the options that you wish to take in the third year, especially if you want to spend more than half of your time on Maths courses in the third year. You should consult your college tutor for advice about this.

Third year Mathematics and Computer Science students offer eight option courses from Schedules B1(M&CS) and B2(M&CS) subject to the conditions that:

- You must offer at least two courses from Schedule B1(M&CS).
- You must offer at least two courses from Schedule B2(M&CS).

You will not be able to offer an option subject in Part B that you have already offered in Part A of the examination. You can find a list of the courses on Schedules B1(M&CS) and B2(M&CS) on the Computer Science website:

https://www.cs.ox.ac.uk/teaching/mcs/PartB/

Synopses for Computer Science courses can be found at
https://www.cs.ox.ac.uk/teaching/courses/.

Synopses for Mathematics courses can be found at
https://courses.maths.ox.ac.uk/course/index.php?categoryid=745.

These courses will be examined at the end of your third year.

1.3   Computer Science and Philosophy

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

- BA Computer Science and Philosophy, 3-year
- MCompSciPhil Computer Science and Philosophy, 4-year

1.3.1   Second and Third Years

For Parts A and B together you must take two Computer Science Part A core courses, plus an equivalent of 14 option "course-equivalents", with at least four from Computer Science, and at least six from Philosophy. The remaining four may be chosen from either discipline without restriction. Each Philosophy option is worth two "course-equivalents" and each Computer Science option is worth one. The possible combinations are:

- four Computer Science options and five Philosophy options;
- six Computer Science options and four Philosophy options;
- eight Computer Science options and three Philosophy options.

Computer Science

Second year Computer Science and Philosophy students take the core Computer Science courses:

- Algorithms and Data Structures
- Models of Computation

You will also take the Group Design Practical.

In addition, you must offer at least two and no more than four option courses from Schedules A1(CS&P) and A2(CS&P). These courses will also be examined at the end of your second year. You can find a list of the courses on Schedules A1(CS&P) and A2(CS&P) on the Computer Science website:
https://www.cs.ox.ac.uk/teaching/csp/PartA/

These core and option courses will be examined at the end of your second year, in your Part A examination.

Third year Computer Science and Philosophy students take between two and six Computer Science option courses from Schedules B1(CS&P) and B2(CS&P), which you can find on the Computer Science website:
https://www.cs.ox.ac.uk/teaching/csp/PartB/

You cannot offer more than two courses from Schedule B2(CS&P). You will not be able to offer an option subject in Part B that you have already offered in Part A of the examination.

These courses will be examined at the end of your third year.

Philosophy

You will take three, four or five Philosophy courses, from this list of courses. You must offer at least two Philosophy courses from 101, 102, 103, 104, 108, 122, 124, 125, and 127.

You will also be able to offer a Philosophy thesis as specified in the Regulations for Philosophy in all Honour Schools including Philosophy (subject 199). You can only offer a thesis if you are doing three other Philosophy courses.

You can find details of Philosophy courses on the Philosophy Faculty Website.

These courses will be examined at the end of your third year.

2 Group Design Practical

The second year course also includes a group design practical as part of the practical requirements for the year. This will allow you to practise the skills you learnt in the core programming courses, and to begin to develop a range of further skills including team-working, project and time management, and presentation skills.

The group design practical is intended to take you 20-30 hours, mainly during Hilary term. There will be a briefing meeting early in Hilary term, setting out the aims and format of the exercise and listing several possible problems to tackle. You will then be allocated to a team of around 5 people to work on one particular problem together. Each team will be allocated a member of staff to act as a supervisor, and will have three meetings with their supervisor during the project.

The first meeting with the supervisor will take place at the beginning of Hilary term, where the group will present a specification and project plan.

The second meeting with the supervisor will take place in Hilary term: the group will present their initial module implementations and test results.

The third meeting will take place in Trinity term: the group will demonstrate their product and deliver a brief final report. Each student will also deliver to the supervisor a one-page summary of their individual contribution.

Finally, the groups will present their work to students, members of the Department, and guests, and prizes will be presented.

The final group report and summary of individual contribution will be assessed as S+, S, Pass or Fail. The group design practical counts as one-third of the total practical mark for the second year and candidates are required to achieve at least a Pass. Your supervisor will submit your group report and the summary of your individual contribution to the Examiners to be considered along with your other practical reports.

3 Examinations for Parts A and B

Exam Entry

You will be asked to complete exam entry for your chosen options in Hilary Term. Please only enter for examinations that you wish to take, and for which you will submit assessment. If you are unsure whether or not you wish to take a course, please discuss it with your tutor and the Academic Admin team.

Joint Schools: Please note that this is particularly important when entering for the Compilers Examination as an option. For this paper once you have entered for the examination you cannot withdraw from it nor change option from it. If you submit the practical assignment in early Hilary Term, you are considered to have entered for the examination and must select it on your exam entry.

Written Examinations

For Computer Science, most courses which are examined by a written examination are sat in Trinity Term. The examination will last for 2 hours. All papers will have three questions, and you may attempt two of them. Questions are marked out of 25. The marks for each part of each question will be indicated on the examination paper.

Mini-projects

Where a Computer Science course is examined by a mini-project, this will be released via Inspera 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. 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 mini-projects
By noon on Wednesday of week -1, Hilary Term (on Inspera)

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

Past Papers

Past papers can be found here:
https://courses.cs.ox.ac.uk/course/view.php?id=667

3.1   Computer Science

The examinations for Part A will be sat at the end of your second year.

You will be examined on four core courses and four option courses from [Schedules A1 and A2](#).

Core courses Concurrent Programming, Algorithms and Data Structures and Models of Computation will each be examined by a 2 hour written examination.

Compilers will be examined by an assessed practical (35% of the marks) and a 2 hour written examination (65%). Instructions for the assessed practical will be handed out on **Friday in week 8 of Michaelmas term**, and the practical report must be uploaded to Inspera by noon on **Friday of week 2 of Hilary term**. The assessed practical will incorporate and extend elements of the lab exercises that were set during term. As always, the work you submit must be your own, except where explicitly acknowledged. The [General Handbook](#) sets out the standards that are expected in this regard. Please see also the University's [guidelines for academic good practice](#).

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

The examinations for Part B will be sat at the end of your third year.

You will be examined on either a total of six option courses from [Schedules B1 and B2](#) (with no more than two from Schedule B2) and a [project report](#) (the third-year project counts as two courses); or a total of eight option courses from Schedules B1 and B2 (with no more than two from Schedule B2).

Courses are either assessed by written paper or mini-project.

3.2 Mathematics & Computer Science

The examinations for Part A will be sat at the end of your second year.

You will be examined on two core Computer Science courses, two core Mathematics course, two option Computer Science courses from Schedules A1(M&CS) and A2(M&CS), and Mathematics options courses - either two papers from A3-A5, A7-A11 or one paper from A3-A5, A7-A11 and paper ASO.

Core courses Algorithms and Data Structures and Models of Computation will each be examined by a 2 hour written examination.

Computer Science option courses are either assessed by written paper or mini-project. The Compilers course will be examined by assessed practical and written paper as for Computer Science (see above).

Second year Mathematics and Computer Science students take the following Maths papers:

A0 Linear Algebra
A2 Metric Spaces and Complex Analysis

Information about the papers for Maths will be provided by the Maths Institute.

The examinations for Part B will be sat at the end of your third year.

You will be examined on eight option courses from Schedules B1(M&CS) and B2(M&CS), offering at least two courses from Schedule B1(M&CS) and at least two courses from Schedule B2(M&CS).

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

Information about the papers for Maths will be provided by the Maths Institute.

3.3 Computer Science and Philosophy

The examinations for Part A for Computer Science will be sat at the end of your second year.

You will be examined on two core Computer Science courses and at least two and no more than four option courses from Schedules A1(CS&P) and A2(CS&P).

Core courses Algorithms and Data Structures and Models of Computation will each be examined by a 2 hour written examination. Computer Science option courses are either assessed by written paper or mini-project. The Compilers course will be examined by assessed practical and written paper as for Computer Science (see above).

The examinations for Part B in both Computer Science will be sat at the end of your third year, in additional all Philosophy papers.

You will be examined on between two and six Computer Science option courses from Schedules B1(CS&P) and B2(CS&P). You will take three, four or five Philosophy courses, from this list of courses. You will also be able to offer a Philosophy thesis if you are doing three other Philosophy courses. You cannot offer more than two courses from Schedule B2(CS&P) and that you must offer at least two Philosophy courses from 101, 102, 103, 104, 108, 122, 124, 125, and 127.

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

Full details of the requirements for the examinations for Philosophy can be found in the Examination Regulations here.

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 – Practicals and Project Reports

2nd Year Compilers Practical Assignment
By noon on Friday of week 2, Hilary term (to Inspera)

2nd Year Group Design Practical
Final Report – By Friday of week 2, Trinity term – you can find more information [on the Department's website](#).
Presentation – Wednesday of Week 3, Trinity term

3rd 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)

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

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

5 Recommended Patterns of Teaching

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

5.1   Computer Science

Paper	Term	Faculty Lectures	Faculty Classes	College Tutorials	Practicals	Comments
Core courses						
Models of Computation	MT	16		4		
Compilers	MT	16		4	Y	
Algorithms and Data Structures	HT	16		4		
Concurrent Programming	HT	16		4	Y	
Group Design Practical	HT/TT	7	6-7 one-hour seminars on software engineering/ testing/working in teams and version control			
Students are required to take 10-12 option courses over the course of the second and third years. The recommendation is that they take four of these in the second year.						
Part A only						
A8 Probability	MT	16				
Parts A and B						
Artificial Intelligence	MT	16	4		Y	
Computer Aided-Formal Verification	MT	16	4			
Computer Security	MT	16	4			
Geometric Modelling	MT	16	4		Y	
Machine Learning	MT	20	4		Y	
Principles of Programming Languages	MT	16	4		Y	
Requirements	MT	16	6			
Computational Complexity	HT	16	6			
Computer Architecture	HT	16	4		Y	
Computer Graphics	HT	16	4		Y	
Data Visualisation	HT	16	6			
Databases	HT	16	4		Y	
Deep Learning in Healthcare	HT	16			Y	
Lambda Calculus and Types	HT	16	4			

Logic and Proof	HT	16	4			
Quantum Information	HT	16	4			
Part B only						
B1.2 Set Theory	MT	16				Offered by the Maths Institute
B6.3 Integer Programming	MT	16				Offered by the Maths Institute
B8.4 Information Theory	MT	16				Offered by the Maths Institute
Combinatorial Optimisation	MT	20				

Notes:

- Second year core courses are accompanied by tutorials organised by colleges; the norm is 4 tutorials.
- Classes will be organised centrally for the computer science option courses, although colleges may alternatively organise tutorials.
- The Group Design Practical, which is part of the practical requirements for the year, is intended to take 20-30 hours, mainly during Hilary term (with some work in Trinity term).
- Students can either undertake a Computer Science Project in the 3rd year which is expected to take about a quarter of the year, or take 2 additional options courses from Schedule B1.

5.2   Mathematics and Computer Science

Paper	Term	Faculty Lectures	Faculty Classes	College Tutorials	Practicals	Comments
Core Computer Science courses						
Models of Computation	MT	16		4		
Algorithms and Data Structures	HT	16		4		
Group Design Practical	HT/TT	7	6-7 one-hour seminars on software engineering/ testing/working in teams and version control			
Core Mathematics courses						
A0 Linear Algebra	MT	16		4		
A2 Metric Spaces and Complex Analysis	MT	32		8		
Mathematics options A						
Either two papers from papers A3-A5, A7-A11 or one paper from A3-A5, A7-A11 and paper ASO						
Computer Science options						
Part A only						
Compilers	MT	16		4	Y	
Concurrent Programming	HT	16		4	Y	
Parts A and B						
Artificial Intelligence	MT	16	4		Y	
Computer Aided-Formal Verification	MT	16	4			
Computer Security	MT	16	4			
Databases	MT	16	4		Y	
Geometric Modelling	MT	16	4		Y	
Machine Learning	MT	20	4		Y	
Principles of Programming Languages	MT	16	4		Y	
Requirements	MT	16	6			
Computational Complexity	HT	16	4			
Computer Architecture	HT	16	4		Y	
Computer Graphics	HT	16	4		Y	
Data Visualisation	HT	16	6			
Deep Learning in Healthcare	HT	16			Y	
Lambda Calculus and Types	HT	16	4			
Logic and Proof	HT	16	4			
Quantum Information	HT	16	4			

Part B only						
Combinatorial Optimisation	MT	20				
Mathematics Options B						
B1.1 – B8.5	MT/HT	16	6			

Notes:
- Second year core courses are accompanied by tutorials organised by colleges; the norm is 4 tutorials.
- Classes will be organised centrally for the computer science option courses, although colleges may alternatively organise tutorials.
- The Group Design Practical, which is part of the practical requirements for the year, is intended to take 20-30 hours, mainly during Hilary term (with some work in Trinity term).

5.3   Computer Science and Philosophy

Paper	Term	Faculty Lectures	Faculty Classes	College Tutorials	Practicals	Comments
Core courses						
Models of Computation	MT	16		4		
Algorithms and Data Structures	HT	16		4		
Group Design Practical	HT/TT	7				6-7 one-hour seminars on software engineering/ testing/working in teams and version control
Students are required to take 10 option courses over the course of the second and third years. The recommendation is that they take four of these in the second year.						
Computer Science options						
Part A only						
A8 Probability	MT	16		4		
Compilers	MT	16		4	Y	
Mathematics for Computer Science and Philosophy	MT/HT	17/ 18		5 LA, 2 CM		
Concurrent Programming	HT	16		4	Y	
Parts A and B						
Artificial Intelligence	MT	16	4		Y	
Computer Aided-Formal Verification	MT	16	4			
Computer Security	MT	16	4			
Databases	MT	16	4		Y	
Geometric Modelling	MT	16	4		Y	
Principles of Programming Languages	MT	16	4		Y	
Requirements	MT	16	6			
Computational Complexity	HT	16	4			
Computer Architecture	HT	16	4		Y	
Computer Graphics	HT	16	4		Y	
Data Visualisation	HT	16	6			
Deep Learning in Healthcare	HT	16			Y	
Lambda Calculus and Types	HT	16	4			
Logic and Proof	HT	16	4			

Quantum Information	HT	16	4			
Part B only						
B6.3 Integer Programming	MT	16				
B8.4 Information Theory	MT	16				
Combinatorial Optimisation	MT	20				
Machine Learning	MT	20	4		Y	
B1.2 Set Theory	HT	16				
Philosophy Options from subjects 101-116, 120, 122, 124, 125, 127-129, 137-139, 198, 199						

Notes:

- Second year core courses are accompanied by tutorials organised by colleges; the norm is 4 tutorials.
- Classes will be organised centrally for the computer science option courses, although colleges may alternatively organise tutorials.
-The Group Design Practical, which is part of the practical requirements for the year, is intended to take 20-30 hours, mainly during Hilary term (with some work in Trinity term).