



DEPARTMENT OF
**COMPUTER
SCIENCE**

UNDERGRADUATE COURSE HANDBOOK

PARTS A & B

For students entering the second year of their course in 2021

Computer Science
Computer Science & Philosophy
Mathematics & Computer Science

2021

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.

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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 2021. 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 <https://examregs.admin.ox.ac.uk/> .

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 2021. 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 MT21	

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 early 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.

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

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 subjects and four optional subjects from Schedules A1 and A2. The four core subjects in Schedule A1 are:

- [Compilers](#)
- [Concurrent Programming](#)
- [Algorithms and Data Structures](#)
- [Models of Computation](#)

The list of courses in Schedule 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.

In the third year you are required to take a total of six optional courses from Schedules B1 and B2 (with no more than two from Schedule B2). The list of courses in Schedules B1 and B2 can be found at <https://www.cs.ox.ac.uk/teaching/bacompsci/PartB/>. These six courses will be examined at the end of your third year. You will not be able to offer an optional subject in Part B that you have already offered in Part A of the examination.

Please take any Trinity Term courses in your second year. They will be examined in your third year, with your options for Part B.

The examination papers will have three questions, and you may attempt two of them. In finals papers, questions are marked out of 25. The marks for each part of each question will be indicated on the examination paper.

In the third year you are also required to submit a project report. The third-year project counts as three courses. [Please find more information on Computer Science Projects here.](#)

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.

- [A3 Rings and Modules](#)
- [A4 Integration](#)
- [A5 Topology](#)
- [A7 Numerical Analysis](#)
- [A8 Probability](#)
- [A9 Statistics](#)
- [A10 Fluids and Waves](#)
- [A11 Quantum Theory](#)
- [ASO Short Options](#)

You must also take the two core Computer Science courses:

- [Algorithms and Data Structures](#)
- [Models of Computation](#)

In addition, you must offer two optional subjects 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.

Please take any Trinity Term courses in your second year. They will be examined in your third year, with your options for Part B.

In your **third year, for Computer Science**, you must offer eight optional subjects from Schedules B1(M&CS), B2(M&CS) subject to the conditions that:

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

You will not be able to offer an optional 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 www.cs.ox.ac.uk/teaching/courses/.

Synopses for Mathematics courses can be found at <https://courses.maths.ox.ac.uk/overview/undergraduate>.

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
- MCompPhil – Computer Science and Philosophy, 4-year

1.3.1 Second and Third Years

As well as the two Computer Science Part A core courses, you have to take 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

In the second year of the degree you are required to take the core Computer Science subjects:

- [Algorithms and Data Structures](#)
- [Models of Computation](#)

In addition, you must offer at least two and no more than four optional subjects 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 optional subjects will be examined at the end of your second year, in your **Part A** examination.

Please take any Trinity Term courses in your second year. They will be examined in your third year, with your options for Part B.

In your third year, for your **Part B** examination, you must choose between two and six Computer Science 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 will also take three, four or five Philosophy courses, from [this list of courses](#).

You will also be able to offer a Philosophy thesis as specified in the [Regulations for Philosophy in all Honour Schools including Philosophy \(subject 199\)](#).

Please note that you can not offer more than two subjects from Schedule B2(CS&P) and that you must offer at least two Philosophy subjects from 101, 102, 103, 104, 108, 122, 124, 125, and 127.

You can find details of Philosophy courses on the [Philosophy Faculty Website](#).

Note that each Philosophy option is twice the weight of a Computer Science option.

You will not be able to offer an optional subject in Part B that you have already offered in Part A of the examination.

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

3.1 Computer Science

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

[Concurrent Programming](#), [Algorithms](#) 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 Inspira 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.

Examinations of the optional subjects will be two hours long with three questions, and you may attempt two of them. In finals papers, questions are marked out of 25. The marks for each part of each question will be indicated on the examination paper.

[Appendix A](#) of the Course Handbook sets out the standards that are expected in this regard. Please see also the University's [guidelines for academic good practice](#).

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

The [examination papers](#) will be two hours long with three questions, and you may attempt two of them. In finals papers, questions are marked out of 25. The marks for each part of each question will be indicated on the examination paper.

In the third year you are also required to submit a [project report](#).

3.2 Mathematics & Computer Science

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

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

[A0 Linear Algebra](#) (1.5 hours). This paper includes three questions and you should answer two; each question is marked out of 25.

[A2 Metric Spaces and Complex Analysis](#) (3 hours). This paper includes six questions and you should answer four. The best four questions count towards a candidate's total mark for the paper.

In addition, candidates must offer either two papers from papers A3-A5, A7-A11, ASO.

You must also take two core Computer Science courses: [Algorithms](#) and [Models of Computation](#), and two optional Computer Science subjects.

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

In your **third year, for Computer Science**, you must offer eight optional subjects from Schedules B1(M&CS), B2(M&CS) subject to the conditions that:

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

For **Computer Science Part B** at the end of your third year, the [examination papers](#) will be two hours long with three questions, and you may attempt two of them. In finals papers, questions are marked out of 25. The marks for each part of each question will be indicated on the examination paper. The Compilers course will be examined by assessed practical and written paper as for Computer Science (see above).

3.3 Computer Science and Philosophy

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

Second year Computer Science and Philosophy students are examined on the two Computer Science Part A core courses ([Algorithms](#) and [Models of Computation](#)) and at least two, but not more than four optional subjects at the end of their second year.

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

You have to take an equivalent of 14 option "course-equivalents", with at least four from Computer Science, and at least six from Philosophy, [as outlined above](#).

Your **Computer Science** options will be examined in your **Part B** examination at the end of your third year. The [examination papers](#) will be 2-hours long three questions, and you may attempt two of them. In finals papers, questions are marked out of 25. The marks for each part of each question will be indicated on the examination paper. The Compilers course will be examined by assessed practical and written paper as for Computer Science (see above).

Your [Philosophy options](#) will also be examined in your **Part B** examination.

4 Important Dates

4.1 Dates of term 2021-22:

Michaelmas term: Sunday 10th October 2021 – Saturday 4th December 2021
Hilary term: Sunday 16th January 2022 – Saturday 12th March 2022
Trinity term: Sunday 24th April 2022 – Saturday 18th June 2022

Dates of Full Term for future years are available [on the University's website](#).

4.2 Hand-In Dates – Practicals and Project Reports

Practicals reports

By noon on Friday of week 5, Trinity term (to Inspira)

2nd Year Compilers Practical Assignment

By noon on Friday of week 2, Hilary term (to Inspira)

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 – Week 3, Trinity term – day to be confirmed.

3rd Year Computer Science Project Report

By noon on Monday of week 4, Trinity term (to Inspira).

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		College		Comments
		Lectures	Classes	Tutorials	Classes	
Core courses						
1. Models of Computation	MT	16		4		
2. Compilers	MT	16		4		This course also has practicals.
3. Concurrent Programming	HT	16		4		This course also has practicals.
4. Algorithms and Data Structures	HT	16		4		
5. 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 optional subjects over the course of the second and third years, to be examined at the end of the third year. The recommendation is that they take four of these in the second year.						
Computer Security	MT	16	4			This course also has practicals.
Computer Aided-Formal Verification	MT	16	4			
Computer Graphics	HT	16	4			This course also has practicals.
Databases	MT	16	4			This course also has practicals.
Artificial Intelligence	HT	16	4			This course also has practicals.
Machine Learning	MT	20	4			This course also has practicals.
Principles of Programming Languages	MT	16	4			
Computational Complexity	HT	16	6			
Computer Architecture	HT	16	4			This course also has practicals.
Computers in Society	HT	16	4			
Geometric Modelling	MT	16	4			This course also has practicals.
Knowledge Representation & Reasoning	HT	16	4			
Lambda Calculus and Types	HT	16	4			

Design and Analysis of Operating Systems	HT	16	4			
Quantum Information	HT	16	4			
Logic and Proof	TT	16	4			
Concurrency	TT	16	4			This course also has practicals.
Computer Networks	TT	16	4			This course also has practicals.

Notes:

- Second year core courses are accompanied by tutorials organised by colleges; the norm is 4 45-minute tutorials.

- Problem classes will be organised centrally for the computer science optional 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 are also required to undertake a Computer Science Project in the 3rd year which is expected to take about a third of the year.

5.2 Mathematics and Computer Science

Paper	Term	Faculty		College		Comments
		Lectures	Classes	Tutorials	Classes	
Core Computer Science courses						
1. Models of Computation	MT	16		4		
2. Algorithms and Data Structures	HT	16		4		
3. 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						
A3 Rings and Modules	HT	16		4		
A4 Integration	HT	16		4		
A5 Topology	HT	16		4		
A7 Numerical Analysis	HT	16		4		

A8 Probability	MT	16		4		Lectured by Department of Statistics
A9 Statistics	HT	16		4		Lectured by Department of Statistics
A10 Fluids and Waves	HT	16		4		
A11 Quantum Theory	MT	16		4		
ASO Number Theory	TT	8		2		Weeks 1-3
ASO Group Theory	TT	8		2		Weeks 1-3
ASO Projective Geometry	TT	8		2		Weeks 1-3
ASO Introduction to Manifolds	TT	8		2		Weeks 1-3
ASO Integral Transforms	HT	8		2		
ASO Calculus of Variations	TT	8		2		Weeks 1-3
ASO Graph Theory	TT	8		2		Weeks 1-3
ASO Special Relativity	TT	8		2		Weeks 1-3
ASO Mathematical Modelling in Biology	TT	8		2		Weeks 1-3
Computer Science options						
Computer Security	MT	16	4			This course has practicals.
Compilers	MT	16		4		This course has practicals.
Computer Aided-Formal Verification	MT	16	4			
Databases	MT	16	4			This course has practicals.
Geometric Modelling	MT	16	4			This course has practicals.
Artificial Intelligence	HT	16	4			This course has practicals.
Machine Learning	MT	20	4			This course has practicals.
Principles of Programming Languages	MT	16	4			This course has practicals.
Computational Complexity	HT	16	4			
Computer Architecture	HT	16	4			This course has practicals.
Concurrent Programming	HT	16		4		This course has practicals.
Knowledge Representation & Reasoning	HT	16	4			
Lambda Calculus and Types	HT	16	4			
Quantum Information	HT	16	4			
Logic and Proof	TT	16	4			
Concurrency	TT	16	4			This course has practicals.
Computer Graphics	HT	16	4			This course has practicals.

Computer Networks	TT	16	4			This course has practicals.
Design and Analysis of Operating Systems	HT	16	4			
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 45-minute tutorials.
- Problem classes will be organised centrally for the computer science optional 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		College		Comments
		Lectures	Classes	Tutorials	Classes	
Core courses						
1. Models of Computation	MT	16		4		
2. Algorithms and Data Structures	HT	16		4		
3. 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 optional subjects over the course of the second and third years, to be examined at the end of the third year. The recommendation is that they take four of these in the second year.						
Computer Science options						
Mathematics for Computer Science and Philosophy	MT	17			4	
Computer Security	MT	16	4			This course also has practicals.
Computer Aided-Formal Verification	MT	16	4			This course also has practicals.
Computer Graphics	HT	16	4			This course also has practicals.
Databases	MT	16	4			This course also has practicals.
Artificial Intelligence	HT	16	4			This course also has practicals.
Machine Learning	MT	20	4			This course also has practicals.
Principles of	MT	16	4			

Programming Languages						
Computational Complexity	HT	16	4			
Computer Architecture	HT	16	4			This course also has practicals.
Computers in Society	HT	16	4			
Concurrent Programming	HT	16				
Database Systems Implementation	HT	22				
Geometric Modelling	MT	16	4			This course also has practicals.
Knowledge Representation & Reasoning	HT	16	4			
Lambda Calculus and Types	HT	16	4			
Quantum Information	HT	16	4			
Logic and Proof	TT	16	4			
Concurrency	TT	16	4			This course also has practicals.
Computer Networks	TT	16	4			This course also has practicals.
Design and Analysis of Operating Systems	HT	16	4			
B8.4 Information Theory						Taught by the Mathematics Institute
B1.2 Set Theory						Taught by the Mathematics Institute

Notes:

- Second year core courses are accompanied by tutorials organised by colleges; the norm is 4 45-minute tutorials.
- Problem classes will be organised centrally for the computer science optional 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).