

# $\Phi$ xford Physics

## THE PJCC PHYSPHIL FRESHERS' GUIDE

2020-21

*The one-stop guide to everything  
you need to know about being an  
Oxford physicist and philosopher*

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## INTRODUCTION

**Dear New Physics-and-Philosopher,**

Once again, congratulations on your achievements so far and welcome to Oxford! Just studying either physics or philosophy alone is a challenging but rewarding pursuit, so studying both together is twice as much so! It's a unique degree, and it'll give you such a varied perspective onto the issues underpinning the world which we inhabit that, with any luck, you won't regret choosing to study it.

This guide is intended to supplement the Physics Guide and provide you with some advice and details especially tailored for students of Physics & Philosophy. Hopefully, you'll find at least something useful in here that hasn't been repeated somewhere else... However, the content of this guide is covered in much more detail in the Physics & Philosophy handbook, which you can access from the undergraduate physics pages once you get to Oxford (<http://www2.physics.ox.ac.uk/students/undergraduates>).

If you have further questions specifically about Physics & Philosophy which the various handbooks you've been given don't answer, don't hesitate to get in touch with me at [ludovic.fraser-taliente@new.ox.ac.uk](mailto:ludovic.fraser-taliente@new.ox.ac.uk) or the PhysPhil rep Jędrzej Burkat [jędrzej.burkat@bnc.ox.ac.uk](mailto:jędrzej.burkat@bnc.ox.ac.uk), and we'll do our best to reply ourselves or pass your query on to the appropriate person. Alternatively, contact Carrie Leonard-McIntyre, the Assistant Head of Teaching ([carrie.leonard-mcintyre@physics.ox.ac.uk](mailto:carrie.leonard-mcintyre@physics.ox.ac.uk)) or Dr Timpson ([christopher.timpson@philosophy.ox.ac.uk](mailto:christopher.timpson@philosophy.ox.ac.uk)), respectively the organisers of the Physics and the Philosophy sides of the Physics & Philosophy course.

**Please remember that the details contained in this guide apply to the course during usual years. Changes caused by global events will not be documented here, because this guide would then become out of date almost immediately.**

I wish you only the very best with your course,



Ludo Fraser-Taliente (PJCC Chair 2019-20)

*The views and opinions expressed in this guide are those of the PJCC and not those of any college, department or the University.*

*The present author, Ludovic Fraser-Taliente, accepts full responsibility for any mistakes and inaccuracies contained within.*

*This work is largely based on the PJCC PhysPhil guide 2018-19, produced by Thomas Galligan and Matthew Davies, itself based on guides from the previous years produced by Ravin Jain, Oliver Humphries and Claudia Clarke who loosely based theirs on the PJCC Guide 2012-2013, produced by Andrew Wilson and the PhysPhil Student Handbook 2010, produced by Benjamin Todd.*

## TEACHING METHODS

Although topics like electromagnetism, optics and practical work are sacrificed from the Physics Course to give the PhysPhils time to study some philosophy, studying for a joint honours degree is probably inevitably more time consuming than studying just one subject, so impeccable time management becomes even more important because in addition to your physics tutorials, you'll also have to accommodate philosophy tutorials and logic classes – and, at the start of terms, more collections (college exams to see how you're getting on, with no bearing on your degree mark)!

## PHILOSOPHY TUTORIALS

In some respects (like the small groups meeting with a tutor (obviously a philosopher rather than a physicist), the hour or so duration and the flexibility), philosophy tutorials are exactly like physics tutorials. However, rather than completing a problem sheet for them, you'll instead have to write an essay and, depending on the tutor, you may not have to do this every week (instead alternating with your tutorial partner) and you may not have to submit them in advance, instead handing them in during the tutorial.

In the tutorial, you'll discuss the week's essay topic with your tutor. Expect them to play "Devil's Advocate" and challenge your views! Philosophy at Oxford very much centres around developing a coherent line of argument, so being able to defend your opinions is an essential ability that you'll have plenty of opportunity to improve and refine.

## PHILOSOPHY LECTURES

Unlike physics lectures, which cover almost everything you need to know, philosophy lectures just serve as an introduction to the topic, pointing you in the direction of other sources which you will want to explore yourself. You're therefore less likely to need to note down every word which your philosophy lecturer says and they're very unlikely to use a blackboard! However, philosophy lectures serve an excellent overview of a particular area, especially if you are choosing which topics you are going to pursue in more depth for an essay – you don't necessarily have to answer essay questions on all the topics which a philosophy lecture series will cover.

Also, note that philosophy lectures, **if held in person**, may be either in either the Philosophy Faculty (on Woodstock Road) or in Exam Schools (on the High Street).

Finally, much like on the physics side of things, you'll receive a questionnaire to fill out at the end of term, where you can leave comments, criticisms and suggestions.

## LOGIC LECTURES

Although they're arranged by the philosophy department, logic lectures often have more in common with physics lectures, probably because logic is very closely related to maths and the subject involves understanding and learning an array of proofs and axioms. However, the introduction to logic course in the first term is the same course studied by other Philosophy schools such as PPE. This course will teach you the basics before you move on in Hilary term to study "Elements of Deductive Logic" (EDL), a more advanced and more mathematical treatment of logic. This is what is mostly examined in your EDL prelims paper, although a couple of challenging questions based only on work in first term may do appear.

Lecture notes will be essential to your learning, because there's no one book that exactly covers the Oxford logic course at the right level.

## LOGIC CLASSES

Although the exact configuration will vary from college to college, the groups for logic tuition are generally a little larger than for physics and/or philosophy tutorials. However, they are otherwise typically quite similar to physics tutorials, in that you'll prepare a problem set which will then be gone over during the class.

## LEARNING FROM BOOKS

Rather than being given a problem set to solve for philosophy (except logic), you'll instead be presented with an essay title and a reading list. A few items on this reading list will be marked as essential reading, but the rest will be optional (there's no way that you'll ever be able to thoroughly read everything on a reading list in the time allocated!) and you'll have to choose what seems most relevant and/or interesting and most appropriate to the line of argument that your essay will develop. The best essays have a narrow focus, if you're too broad your essay will rapidly turn into a book! Your tutor will probably offer you some advice and recommend some of the readings above others.

When spending time reading philosophy, remember to prioritise quality over quantity – it’s much better to have properly digested one particularly relevant chapter than to have skimmed over an entire book.

In terms of Logic, for the Introduction to Philosophy course, the standard textbook is Volker Halbach’s “Logic Manual”. It is specifically written for the logic course at Oxford and offers a comprehensive treatment of all topics in the Introduction to Logic prelims paper. The situation with EDL is less straightforward. There is no specific textbook in the library that gives a thorough overview of the course at Oxford. There are however lecture notes and PDFs on Weblearn by Blamey, Eagle and Studd that should be very helpful.

## LEIBNIZ-CLARKE CORRESPONDENCE LECTURES AND TUTORIALS

The Leibniz-Clarke Correspondence is studied in the first part of Trinity term and is the first opportunity to study the Philosophy of Physics! All PhysPhils should attend the Leibniz-Clarke Correspondence lecture; however, these lectures may feel like classes as there are only usually 10-15 PhysPhils in a year.

Your tutor will organize tutorials for you with them, or with a Philosophy of Physics specialist at another college. These tutorials will be just like tutorials for General Philosophy. You will prepare an essay for the tutorial and go through it with the tutor.

## LEARNING FROM OTHERS

Even more so than physics, philosophy is a subject that benefits from discussion – as you’ll soon discover in tutorials. However, don’t limit your philosophising to them; talk about it with other young philosophers, and not just your fellow PhysPhils. PPEists, MathPhils and even students who aren’t technically philosophers at all can all give you an alternate perspective on philosophical issues.



*Leibniz – physicist, philosopher and mathematician: the archetypal PhysPhil?*

## THE COURSE

The syllabi for the physics papers which you'll be examined on alongside the "ordinary" physics students (who don't take philosophy) are found in the physics handbook. However, for information about the content of your philosophy courses, you'll need to browse the philosophy website, once you've got an Oxford "Single-Sign-On" computer account: <http://www.philosophy.ox.ac.uk/undergraduate>. Past papers are also available, to give you an idea of what you'll be expected to produce in a philosophy exam – usually 3 (or in first year, 4) essays in 3 hours, sometimes with the condition that a certain number must be taken from particular sections. The essay titles are chosen from a long list, often spanning 10 to 30 possibilities.

## FIRST YEAR

The first year for PhysPhils is even more mathematical than for the plain physicists. This is because, although you'll study all of the pure maths with them, you won't study some of the more applied aspects of physics at all (namely, optics and circuit theory) and other physical theories like electromagnetism are postponed until second year. There are also no Short Option papers for PhysPhils. You won't have to do any practicals in the first year either, which many PhysPhils see as one of the biggest perks of their course!

The logic courses add yet more mathematical elements, so you may find the essay based Introduction to Philosophy course a welcome change in first year.

In first year, the papers are as follows:

*CP1: Physics 1* (mechanics and special relativity)

*CP3: Mathematical Methods 1* (complex numbers, differential equations and matrices)

*CP4: Mathematical Methods 2* (calculus, vector calculus and waves)

*Elements of Deductive Logic*

*Introduction to Philosophy: General Philosophy and the Leibniz-Clarke Correspondence*

All of the papers are compulsory for first year Physics & Philosophy.

Each of the physics papers (the CPs) consists of a Section A, which carries 40 marks and in which every question must be answered, and a Section B, in which you answer 3 of 4 questions carrying 20 marks each.

The Philosophy paper consists of a General Philosophy section and a Philosophy of Physics section (the Leibniz-Clarke Correspondence). You must answer one question from both sections, other than that you may answer whatever questions take your fancy. Each philosophy essay written for a paper is given a mark, which are usually then averaged to give a final mark to your philosophy paper.

Just as for physics, there are rewards for doing well in these exams and consequences for failing.

## SUBSEQUENT YEARS

After making it through all the maths of the first year, subsequent years now start to use these foundations to teach you physics, while the philosophy you learned forms the basis for exploring similar ideas in more depth.

For Part A in the second year, although you will have been studying philosophy (the Philosophy of Physics, the Philosophy of Science and either Knowledge & Reality or the History of Philosophy), all the exams are in physics, in the form of three compulsory papers:

A1: *Thermal Physics*

A2P: *Electromagnetism* (this paper is based on the CP2 paper taken in first year by ordinary physicists)

A3: *Quantum Physics*

In your third year (Part B), you'll take exams in both physics and philosophy. The physics papers cover a very broad range of topics, from subatomic physics to general relativity.

In the Part C course, taken in the 4<sup>th</sup> year of the MPhysPhil, you take three courses, which can be chosen in any combination from the 7 physics fourth year major options, the myriad of philosophy Final School Papers, a physics project or a philosophy thesis, depending on your personal preferences, so you've got plenty of time to decide if you want to eventually study all physics, all philosophy or carry on with a blend of the two.

Obviously, more details about the structure of the course and the choices you'll have to make will be given to you as you progress through the years. Don't be afraid to confer with your tutors for advice about which options to take – their opinions are often useful for helping you to make up your mind.

## LIBRARIES AND BOOKS

Critically reading and responding to the works of others is such a fundamental part of philosophy that you'll inevitably end up using more books for the philosophical side of your education. Some of the philosophical texts and articles you'll need to read will be available online, which will spare you having to buy or borrow them. However, that won't be always be the case, so sometimes if you'll want to annotate passages you'll have to buy your own copies – finding out your college's policy on contributing to book costs becomes even more important!

However, if you don't want to write in your philosophy texts, just as for borrowing physics books, you can use your college library (or the Union or the Bodleian) for finding philosophy books, but you also have one extra resource at your disposal: the Philosophy and Theology Faculties Library, a branch of the Bodleian dedicated to philosophy (and theology, although you might find those books somewhat less useful...). More information can be found at <http://www.bodleian.ox.ac.uk/ptfl>.

## PREPARATION OVER THE VACATION

In addition to mathematical revision and any physics work that you may have been set, you may find it useful to carry out some introductory reading, particularly if (like many PhysPhils here) you haven't had much experience of philosophy before. If your tutor hasn't given you any specific recommendations, then Bertrand Russell's "The Problems of Philosophy" is perhaps a good place to start. Your Philosophy tutor may also ask you to look at chapters in "The Logic Manual" to get a head-start in Logic.

## EPILOGUE

Now that you've finished reading this, you can start reading something more interesting – as a PhysPhil, you'll have no shortage of fascinating reading material over the next four years. We hope that you'll agree and also have an incredible time at Oxford.

Good luck!