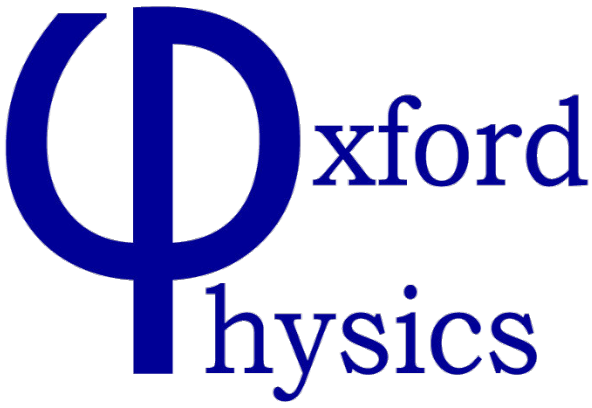

THE PJCC FRESHERS' GUIDE

2023-24

Gareth Hopkins
<*gareth.hopkins@sjc.ox.ac.uk*>

PJCC CHAIR 2023-2024

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INTRODUCTION

Dear New Physicist,

Welcome to the big leagues! Over the next 4 years you will learn some incredible theories and find out about some awesome discoveries, but you'll also learn a lot about yourself! I can say with confidence that you're going to enjoy unraveling the secrets of the universe!

Although you will undoubtedly be overloaded with introductory guides, please read this one as almost everything here matters to you. This guide will give you a picture of life as a first-year physicist in Oxford, containing the sword(i.e. our advice) and spells(e.g. important website links) to tackle down college-level physics. A more detailed explanation of the structure, syllabus and assessment of the course is in the 2022-2023 Undergraduate Course Handbook, which is available here (http://www2.physics.ox.ac.uk/students/undergraduates). It's strongly recommended to have a look through it, both during Freshers' Week and again later whenever you have questions about the course – you'll be surprised by how many answers it contains! However, if you can't find the answer, please remember that the PJCC will always be there to help you. Really do check the handbook when you have an issue though, the first thing I do when asked a question is comb that bad boy.

More helpful resources can be found on our PJCC (Physics Joint Consultative Committee) webpage http://pjcc.physics.ox.ac.uk), under "Resources". This website contains contacts of the PJCC members, exam weightings, internship opportunities and the legendary notes by one of our PJCC reps in the past.

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 Changes caused by global events will not be documented here, because this guide would then become out of date almost immediately.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 all the very best of luck revealing the universe!

Gareth Hopkins (PJCC Chair 2023-24)

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, Gareth Hopkins, accepts full responsibility for any mistakes and inaccuracies contained within.

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TEACHING METHODS

Terms in Oxford (*Michaelmas* – autumn, *Hilary* – spring, *Trinity* – summer) are very short compared to other universities (only eight weeks long!). The workload is intense, and the pace is *very* fast. Therefore, it's easy to get left behind – all it takes are a few rehearsals, rowing outings, debating events or bops (college parties), in addition to lab work and lectures, and suddenly a week seems very short. You can have fun and do physics (the two aren't mutually exclusive[1]!) but it's vital that you're organised with your time. You'll probably have to do about 2 problem sets each week.

Below is how a typical day might look like:

"I usually get up at 8am to be in the lecture theatre by 9am(don't worry if you are slightly late! We have a five-minute policy). After about three hours of lectures, I go to the college hall/cafe to have a quick lunch. Then I spend the afternoon doing problem sets/reading textbooks if there are no tutorials planned. I try to have a long dinner break with friends every day after that. When night falls, I sometimes go to the library and have a last two-hour study session with friends. However, things don't usually go as planned. What happens is that I stay up late to finish a problem set due the next day or the dinner break extends into a rest-of-day break. "

The periods in between terms are known as the *vacations* – so called not because of a preference for American parlance, but because they are just times when you have 'vacated' the University. These vacations should be used to relax and recover from the stress of an Oxford term (It's a strange situation where you're always glad for the vacation's arrival and subsequently you're itching to get back!). However, you will need to go over the work done during the previous term and perhaps read about the topics to be covered during the subsequent term. Colleges normally provide a focus in the form of internal exams (known as *collections*) at the beginning of each term. These have no bearing on your final degree – they are simply to help you and your tutors find out how you're progressing, and allow you to practise for your real exams at the end of the year, as they're often almost identical in format. The seriousness of these collections depends entirely on your college: some may make you do them again if you do badly, however with adequate preparation, they shouldn't be something you have to worry about!

TUTORIALS

Oxford is a collegiate university and so, other than in lectures and labs, most of your teaching will be based in your college. No two colleges operate in exactly the same manner and the best way to find out exactly what to expect is to talk to your tutors and physics students in the years above at

[1] For a fusion of fun and physics (#PhysicsPhun), you might want to join our Physics Society, which puts on weekly talks and arranges social events. For more information: http://www.physsoc.co.uk/.

your college. However, there are many similarities between the colleges so here's a general overview of how tutorial based teaching at Oxford works:

Tutorials (or "tutes") are an opportunity for you to be taught by a member of the physics department, usually a specialist in the subject. The exact structure and nature of the tutorial varies from tutor to tutor (who can be anyone from a graduate student to a world-leading professor, either from your college or elsewhere in the department). Most tutors will ask you to submit work for a problem sheet before the tutorial, which they will mark in advance and discuss with you in the tutorial. Your experience of tutorials may differ quite significantly from that of many of your friends in other subjects. Though not a bad thing, this is a difference to be aware of.

Oxford Physics problem sets probably won't be much like the school homework you'll be used to – for starters, they're a lot more time consuming. Be prepared to spend up to 8 hours working on just one problem set – infrequently less, and often more. They take so long because solving problems is how you actually learn the material you've covered. Although there are some "book work" questions, most questions will ask you to apply the abstract material from lectures to an unfamiliar problem. Lectures don't teach you how to tackle the specific problems - they just give you the knowledge you'll need to attack those successfully. Fortunately, the tutorials *will* teach you how to tackle problems.

What exactly is a tutorial?

A tutorial is a meeting all students have with a tutor and usually one to four other students. You will mostly go over problem sheets previously covered in lectures. However, sometimes you will have problem sheets due before lectures on the topic, meaning you will need to teach yourself. Problem classes (normally all the physicists in your year at college and a tutor) are also held on an irregular basis, for example to go over collections. During the first year you will have about two problem sheets per week (one in physics and one in maths).

Tutors organise their tutorials in different ways. Some will ask you to attempt questions on the board, others may give a mini-lecture of their own. Many tutors stick closely to the question sheets handed out in lectures, whereas some set their own questions. They may opt to introduce new material themselves or go over a technique a lecturer has covered from a new perspective.

The biggest upside of the tutorial system is its flexibility. Your tutor will get to know you quickly and will be able to see where you are having problems, directing you as necessary. With very few other students present it is much easier to ask questions. Try to make use of this as much as

possible – do not worry that you are wasting your tutor's time, they are there to help and want you to do well! Often a tutor can give you a reply to a question immediately for which you might otherwise have spent hours of searching in books or on the internet to find the answer. If you think of a question outside of a tutorial, don't be afraid to email your tutor and ask them. They will typically e-mail you a response or give you an answer in person during your next tutorial.

Remember that tutorials are an opportunity to talk with professional physicists and learn about aspects of physics that may be completely off the course. These extracurricular discussions can be particularly delightful and provide you with a wider view of physics in general. If you ask them, your tutors will happily tell you all about their research and might even show you around their lab. Your tutors will also typically be glad to help you find a vacation placement, which will enable you to get a better insight into what actual research is like.

Lectures

For most students, the lectures and lecture notes will be your primary source of information, since they cover all the material more concisely than any single textbook. Attendance is hence very much advised (but not compulsory). These lectures are all held in the physics department (in the Clarendon Laboratory), mostly in the mornings and starting on the hour. In the Covid years lectures were not in person, but a useful byproduct from this is lecture recordings. It's okay if you can't get up in the morning sometimes as lecture recordings can be found on Canvas, the University's Virtual Learning Environment.

The online lecture timetables (www.physics.ox.ac.uk/lectures - use your department account, not your SSO) have links to the lecturers' web pages on Canvas, where you will find relevant course content. The doors to the Clarendon Laboratory are open to undergraduates between 08:30 to 17:00. You need your Bod (University) card to get in, so don't forget it!

Once inside the lecture theatre, you'll join the 170 or so other first year physicists from all colleges for the lecture. The lecturer will stand at the front and explain their topic, perhaps with the aid of slides on a projector, but more usually (especially in the years that follow) by just writing on the blackboard. Lecturers will vary in how they provide notes (if they do at all). Some produce reading lists with references to specific books (and chapters within them) and an accompanying set of detailed notes whereas others may just summarise the key points and so you'll need to attend the lectures to see the details. All lecturers' supplementary material may be found online at the same address as the timetable – just click on the lecture and locate the 'Lecture Materials'.

You'll receive so much information in lectures that you won't be able to remember it all without taking some form of notes. It is up to you if you prefer to annotate the existing notes during lectures, or make your own entirely, whether handwritten or in LaTeX/Overleaf. The best thing to do is to go to the first few lectures to get a feel for what they are like and subsequently act based on your own preferred style of learning. However, don't get so caught up in the note-making that you lose track of what you're actually being taught. Something that has to be mentioned here are the lecture notes provided by one of our famous PJCC members. **We call it the Toby Adkins notes. You can find it here: https://pjcc.physics.ox.ac.uk/resources/notes/ (must be on Oxford network).** Many of us have survived using these notes, and the legend lives on.

Question sheets are sometimes handed out in lectures but should always be available online on the lecturer's web page. These are exercises based on the material covered which your tutors will almost certainly set you for tutorials. Entire questions may be devoted to topics that the lecturer only spent five minutes on, so it's almost always worthwhile going back over your lecture notes (ideally with another textbook) to check that you've fully understood everything. **As many lecturers point out, the lecture notes are not designed to teach you absolutely everything you should know – the use of other resources, particularly their recommended textbooks, is vital.** If you haven't understood something, feel free to ask a question (or two!) in a tutorial where your tutor will explain the topic, even if it's not directly related to this week's problem set. You should also feel free to email the lecturer directly. Moreover, different physicists will usually explain the same topic in slightly different ways, which is very useful if you had trouble understanding it the first time.

At the end of each term you must fill out an online lecture feedback questionnaire. The results are pored over by the individual lecturers as well as the Head of Teaching. They are then discussed with the faculty in the PJCC meetings (more on these later!). **Please fill up the questionnaires!** I was so shocked to find that only 10 people on average left comments on each lecture. Not all lectures are perfect, and the only way to ensure that you can get the best education next year is by setting up the tradition to help the coming freshers. **The lecturers really listen to your reasonable comments, I promise.**

Learning from Textbooks

A very important skill that you need to acquire at university is independent learning. It becomes more essential as the course progresses so try to learn it early on rather than relying only on lectures. To reiterate the bolded section above, reading the relevant sections of various textbooks will give you a deeper understanding, a different perspective, and will ensure you know the topic more thoroughly. Sometimes, new topics must be learned entirely from textbooks; say, for a

practical, or if you have missed several lectures through illness. Sometimes, tutors will set work before the relevant lectures have been given. This is a good opportunity to read ahead and means that you learn a lot more when the actual lecture detailing the work comes up.

Your tutors, older students, and lecturers won't hesitate to recommend books if you ask (and even if you don't!) but don't be afraid to deviate from their suggestions and use the books that you like best.

Learning from Others

Last, but not least, it's a great idea to meet up with other physicists from your college or year in general to go over the material covered in the course. You may notice that some problems can be solved much more quickly this way and that explaining a topic to others helps you to get a better idea of it yourself and realise where your weaknesses are. On the whole, physics students tend to do much better when they work together.

Moreover, always remember that older physicists in the years above you are on the same course as you! They have walked where you'll walk, attended the same lectures that you'll be attending, and have done the same problem sheets that you'll be doing; they're in a very good position to offer advice on any questions you might have about the course or specific queries you might have about physics. There is also a thriving graduate community in the physics department and your college will most likely have some graduate physicists associated with it (some of whom will be products of the Oxford undergraduate physics course themselves). Some colleges even have a graduate mentoring scheme set up but regardless of whether there is a formal system, don't forget that graduates are always happy to help you if you're stuck.

The Course

Full descriptions of the courses and the exam papers are given in the Undergraduate Physics Handbook (although attending the lectures soon gives you a taste of what each one is like). The handbook contains a list of the examinable topics on each course (the syllabus). It's worth getting acquainted with the syllabus, as some lecturers will dip into areas of physics which, while interesting, are non-examinable, and the lecturers may not make it extremely clear when they're doing this. It also helps you determine what you do and don't yet know when you start revising.

Previous exam papers can be found on Canvas for examples of what sort of problems you'll be expected to solve. However, examiners and the syllabus can – and often do – change from year to year, so don't be surprised if some of the older questions appear totally irrelevant and unfamiliar. The department does not provide solutions to these, for an assortment of very good reasons, including the fairly fundamental one that being able to judge the correctness of your solution is one of the most important skills a physicist can have – after all, no-one at CERN gets a solution booklet for the universe. However, you will receive feedback on your past exam solutions during revision tutorials organised by your college prior to University exams.

First Year

The first year of the course is *very* mathematical, which may come as a shock, particularly compared to what you may have been used to at school. You are effectively learning a language, which will be used in the rest of the course to model the world we see around us. Interpreting the solutions to these models gives us some understanding of how the world works. You should always try to then see the physics behind the equations and results you get, and not just behave like a human calculator. To help you do this, during the first year, you also learn the foundations of some of the most important branches of physics (namely classical mechanics, special relativity, optics and electromagnetism) which will crop up again and again as you progress further in physics. Getting the first-year material cemented firmly in your mind will therefore help you enormously in future years.

Examination at the end of first year is in the form of exams known as "Prelims", short for "Preliminary" examinations. These exams do **not** count towards your final degree classification, but you will be told your percentage marks and an award of Distinction, Pass, or Fail. It is necessary to pass prelims to continue with the course, so students who miss the pass mark (around 40%) in one or more papers will get a chance to retake the exams in September. Distinctions are awarded to roughly the top 30% of the year, and some colleges may award scholarships to students receiving them. Spending the summer revising for exams that you must pass to stay in Oxford is not pleasant, so do take Prelims seriously. They're also very good practice (you even have to wear your academic dress, called *sub-fusc*) for the exams that you'll take at the end of all the later years of your course, which will count towards your degree classification.

The Prelims papers that you'll be sitting are as follows:

Compulsory:

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

CP2: *Physics 2* (electromagnetism, circuit theory and optics)

CP3: *Mathematical Methods 1* (differential equations, complex numbers, matrices & vectors)
CP4: *Mathematical Methods 2* (calculus, vector calculus normal modes and waves)

Short Options:

S01: *Functions of a Complex Variable*
S02: *Astrophysics: From Planets to the Cosmos*
S03: *Quantum Ideas*

Students take all four compulsory papers and then choose one of the short option papers. You will not receive tutorials for your Short Option, which is intended to add breadth to your course. Functions of a Complex Variable may be done in the first, second or third year, while Astrophysics and Quantum ideas are only available in the first year. You cannot take the same course twice. If you're not sure which to pick, your tutors will be happy to offer their advice as to which one they think will be best for you. Some information about the different short options can be found online at https://pjcc.physics.ox.ac.uk/resources/guide/. The short option syllabuses, just as for the compulsory papers, are found in the Undergraduate Handbook.

Each compulsory paper lasts 2hr 30mins and 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 more in-depth questions carrying 20 marks each. Every short option paper is structured similarly: you must offer solutions to 2 of 3 questions in 1hr 30mins.

Subsequent Years

During the second year (Part A) and third year (Part B) the course concentrates on giving you a rigorous grounding in the standard areas of physics, but focuses more on the physics itself rather than the maths underlying it. There are still mathematical lecture courses in the second year, but the content is examined through its applications in the physics papers, rather than for its own sake.

Exams are in Trinity Term of the second and third years, covering the Part A and Part B syllabuses respectively. They are usually quite late compared to many other subjects, which gives you more time to revise, though the precise timetabling of the exams is never guaranteed.

For Part A there are 3 compulsory papers:

A1: *Thermal Physics*
A2: *Electromagnetism and Optics*
A3: *Quantum Physics*

For Part B, you can study a broad range of topics, from particle physics to general relativity.

In both 2nd and 3rd year, you must take a short option paper but this time, you can choose from a wider range of short option topics such as Classical Mechanics, Energy Physics, Biological Physics, Exploring Solar Systems, History of Science or even a language option! Some short options are only available every other year, so check the schedule for the topics you're interested in.

At the start of your 3rd year, you will also make a decision between the 3 year BA and 4 year MPhys versions of the course. If you choose the BA, you will most likely work on a group industry project alongside three Part B written papers. If you choose the MPhys, you will instead take a higher number of courses in Part B, followed by two more specialised courses and an extended research project in Part C.

There is also a 4th year-only course for those more mathematically inclined – the MMathPhys – which is run jointly with the maths faculty. This course contains a wide range of taught courses that will prepare you for PhD studies in an area of Mathematical and Theoretical Physics. You can find more details online at https://mmathphys.physics.ox.ac.uk/, but regardless of whether you're interested, you don't need to worry about this until your 3rd year!

Of course, you'll find out all about the structure and content of the later years in much more detail as you progress through the course.

The Practical Course

Physics is a (somewhat) practical subject, so doing experiments is an important part of the physics course in Oxford. This is just an outline of the Practical Course, but you'll be given a much more comprehensive guidebook by the Department during the first week of term, and there will also be a safety lecture regarding practicals.

Practicals are done in the same pairs each week, usually with someone from your college, although if your college cohort has an odd number of students you may be working with someone from another college. Working in pairs really helps; it gives you someone to talk about the experiment with and makes setting up the equipment a lot easier.

The practical labs are very different from the experiments you will have done at school. In the first year you will spend a full day performing an experiment, rather than just an hour or so, giving you enough time to explore the experiment in some depth. In further years, this is extended to two days for one experiment.

For each practical, you are provided with a detailed script including instructions telling you what to do, technical details about how to set up the apparatus, all the relevant theory, and questions relating to the theory. All the scripts can be viewed online and printed; it's essential to read through the script *before* you arrive to do the experiment so that you have an outline of what you will be doing. This will help save time at the beginning of the day and increase your chances of finishing early. **In some labs, you may not be allowed to start until you have read the script, as it may be too dangerous otherwise.**

The labs are staffed with demonstrators and a few senior members of staff, who will sign off on your experiment to prove you've completed it. Demonstrators are usually graduate students from Physics, and many will have gone through the Practical Course as undergraduates. They are there to answer questions, explain things you don't understand, and help set up your experiments. Frequently, the experiment will involve physics that you have not yet studied. Thankfully the demonstrators are understanding, and they will accept that it may take you a while for you to get your head around it. However, just like in the real world, the advice you are given in the script may not necessarily be entirely correct, and your equipment will not always work perfectly. Dealing with this is a critical part of becoming an experimental physicist.

You can give feedback about the different practical labs at any time, and comment on individual experiments (using "SPIRe" – a construct which you will get to know all too well very soon). Any (constructive) comments, criticisms and ideas left here will be taken into consideration to improve the practical course.

First Year

During the first year you will spend one day in the teaching labs each week. There are also computing exercises that have to be completed each term for which there are no "official" lab days (but you can easily find demonstrators ready to help you with any issues you have).

The requirement for practical work in the first year is usually 17 days, and ideally you won't have to do any practicals in Trinity Term. Try not to get behind with practicals; if you miss one you can catch up at the end of Hilary Term, but you don't want to cut it too close. The Prelims practicals are grouped into 5 different areas: Optics, Electronics, Electrostatics and Magnetism, Computing, and General Physics (which is mostly Mechanics). Throughout the year, you'll be expected to keep a "Logbook" which contains a record of each experiment that you do such that you should be able to reconstruct the experiment or write a report on it even if you were to revisit it an year later. (if this sounds intimidating, don't worry for the demonstrators will guide you on how to write a log for your practicals)

First year experiments are done on either Thursday or Friday depending on your college between 10a.m. and 5p.m. If you have been working well during the day then you won't be made to stay after 5p.m.; if you manage to finish it beforehand, you can go straight home. At the end of the day, you have a discussion with a demonstrator in the lab and based on your understanding of the practical and the work you've done, (which is evidenced by the log you keep in your logbook) the demonstrator gives you a mark out of 5. Although this mark doesn't count towards your Prelims score, commendations are awarded to the best performing students in the cohort at the end of the year.

For two of your practicals (one each in Optics and General Physics), you will also have to write a report and discuss the practical in depth with a demonstrator. For more detail, please see the Prelims handbook.

Subsequent Years

In the second and third years you spend two days every fortnight in the labs, so that you can do longer experiments. You alternate between practical weeks (which can be fairly hectic!), and non-practical weeks. It's worth asking your tutors if they'll take this into account when arranging tutorials as they're likely to be accommodating.

The choice of practicals is wider than during the first year, so you can pick those which you find most interesting; the only compulsory lab is electronics. You will also complete an extended project during the final year of your degree.

There are a number of possibilities to replace some practicals with other courses; for example, by taking an extra 'Short Option' paper or by taking the 'Teaching and Learning Physics in Schools'

option. This involves working in a local secondary school helping to teach physics; more information will be provided in an introductory talk in Trinity 2022.

Computing

It is hard to overstate the importance of computer programming in modern physics; virtually every active researcher in physics uses programming on a regular (if not daily) basis. You will soon discover that the number of physics problems that can be solved by hand is a very small subset of what physicists have to contend with, so an understanding of computing is absolutely essential.

You will have a few introductory lectures on computing, as well as some projects to complete as part of your first-year practical work. The language currently taught by the department is MATLAB, which you can download onto your own computer once you have your IT login details. Working physicists often write code in a variety of languages, so you are encouraged to explore the world of computer programming in as much depth as you can, particularly if you plan to continue in physics after your degree. For more resources, please see the department's programming resources page.

In computing, perhaps more than in any other part of physics, **the only way to learn it is to do it**. Computing requires a whole new way of thinking; you must learn to think and work in algorithms rather than in equations. While the course at Oxford does the best it can, it is impossible to teach a level of competence in computing in just a few lectures and labs. Furthermore, probably the most essential (and hardest) part of programming is debugging, which is a skill that is very difficult to teach, especially in a group environment. It is therefore essential that you practice programming in your own time, making and finding your own mistakes.

Libraries and Books

There is no single textbook that covers all the material on the course so it is necessary to use a variety of books for each aspect of the course, some of which, although recommended by tutors and lecturers, go well beyond the level required. You will usually have a long reading list of recommended books for each topic, but fortunately, you won't have to read all of them. A few core texts might be marked as essential, but otherwise, you're free to choose whichever book (or books!) covers the material in a manner most suited to you. It's worth having a look through a few before deciding which to get. Once you've decided which books you like, there are multiple options available when it comes to acquiring them: buying a physical copy; using the university or

college libraries (including their online options – you will be told about SOLO during your library induction); or using digital copies.

Oxford's extensive library system is unique (apart from maybe "the other place"[2]) and if your college library is good (and most, if not all, are), you will very rarely need to spend money on books. However, if you do find it necessary to buy a book, try to get it in the secondhand section of a bookshop (Oxford is not lacking in bookshops) or from someone in a higher year. Some colleges may repay you some of the cost of buying books - so keep the receipts.

College Library

Your college library should have most of the books you need for the course and will stock multiple copies of the most frequently used. Your tutor or librarian will usually order more copies if there are not enough, and you can request books to be bought that are not stocked.

Radcliffe Science Library (RSL)

This is part of the Bodleian Library (which by law can request copies of any book published in the United Kingdom) and is dedicated to science books so it's most likely to have what you're looking for. More details about the RSL and lending services can be found at http://www.bodleian.ox.ac.uk/science/use/.

Note that the RSL is currently closed for redevelopment. The Vere Harmsworth Library in the Rothermere American Institute is now the main base for RSL services. VHL has very modern facilities and it has many single desks by the windows for individual works.

Other

These aren't the only two libraries available to you: students who are members of the Oxford Union[3] can use and borrow from the Union Library and all students can use the main Bodleian library, although they can't borrow from it. However, there are a huge number of other Bodleian

[2] A snarky term for Cambridge, due to the centuries-old rivalry between it and Oxford.

[3] The Oxford Union is a debating society - not to be confused with Oxford SU (Student Union), the organisation which represents the entire student body.

libraries that exist - most of which look utterly gorgeous, and all of which are worth investigating. In addition to being an invaluable source of books, they also provide a quiet environment in which to work.

Figure 1: Bodleian logo

PREPARATION OVER THE VACATION

You may have been given vacation work and a reading list as part of the recommended preparatory work; try to finish your vacation work before you arrive in Oxford – there are a lot of things to do in Freshers' Week, most of them more fun than a problem sheet! It is useful to loan at least some of the books from the list and begin reading them. **Mathematical Methods for Physics and Engineering** by *Riley, Hobson and Bence* is recommended by most tutors and is particularly useful as it covers almost all the maths you will ever need, but an alternative text, **Mathematical Methods in the Physical Sciences** by *Mary Boas*, which some students prefer, is also a good place to start. You can also find some first-year lecture notes on the lecturer's webpage. For example, the linear algebra notes can be found here:
http://www-thphys.physics.ox.ac.uk/people/AndreLukas/V&M/V%26Mweb/index.html

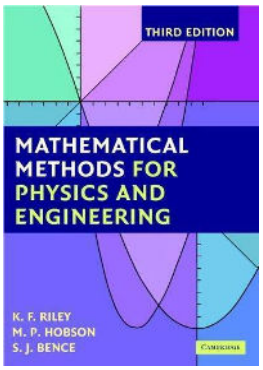

Figure 2: RHB - the most popular maths textbook for Oxford Physic

In addition to introducing yourself to one of these books, it is helpful to read over your A-Level notes, especially those on maths, and re-familiarize yourself with topics like integration, differentiation and complex numbers since development of these will be one of the main features of the first year course. Be aware that you won't be given anywhere near as comprehensive a formula sheet

for your Prelims compared to at A level, so make sure you know (or know how to derive) all those standard integrals/derivatives!

If you didn't take Further Maths A-Level you should be aware that while the first two weeks of lectures will be revision for most, they will probably cover new topics for you, so you will have to work hard to make sure you grasp these fully, as they'll form the foundations of the rest of the year's work. Therefore, it's useful to read some Further Maths books if they are available to you. If you find yourself struggling, you should ask your tutor for help or advice.

Clubs and Societies

Oxford is a place where every society imaginable exists, in one form or another. For a list of university-wide clubs and societies, see the Register of Student Clubs. This section exists to draw your attention to some of the ones you may be interested in as physicists, but remember that, if you have the time, there's nothing wrong with indulging in other pursuits while you are here.

As mentioned earlier, there is a thriving physics society in Oxford (OUPS) that meets regularly for lectures and social events. In addition, there's a scientific society too (OUSS) that is one of the oldest undergraduate scientific societies in the world. They not only organise speaker events but also occasionally organise tours to various scientific establishments.

Within the physics department, there are two major societies that you may not have heard of: the Oxford Physics Gender Equality Network(previously Oxford Women in Physics) and the Physics Joint Consultative Committee (PJCC), the latter of which designed this guide!

Oxford Physics Gender Equality Network

Oxford Physics Gender Equality Network(previously Oxford Women in Physics) was set up a couple of years ago in order to promote career development of women(and now also non-binary people) in physics, from undergraduates, through to graduates, and onto to academia, supporting them at every step of the way. The society provides an opportunity for women across all these different stages to interact, get together and benefit from a pool of role models and mentors.

Not only does the society have an active mentoring scheme, but they also host tea sessions, lunches, and banquet dinners. They also were key in organising and hosting the UK's first ever Conference for Undergraduate Women in Physics in March 2015, which was a resounding success!

For more details, click on the links above or check out their website, where you can find contact details of the committee. I highly recommend you to follow their social media accounts and join the mailing list. We also have a chat on Microsoft Teams in which physicists from all stages can get to know each other and get advice!

The Physics Joint Consultative Committee (PJCC)

The PJCC meets twice a term (at a lunchtime in second and seventh weeks) and consists of a number of undergraduate student representatives (reps), ideally at least one from each year and a few others with specific tasks, like representing Physics & Philosophy students. It meets with a few key members of staff to discuss ways to improve the Oxford undergraduate physics course, covering issues such as teaching, changes to the syllabus, examination procedures and most importantly, addressing any suggestions or complaints which students (both on and off the committee) have raised. The PJCC is always chaired by an undergraduate student, who further represents the students' views by sitting on various other committees and raising any relevant points there.

There are many ways to contact us, the student members: you can use the form on the webpage (https://pjcc.physics.ox.ac.uk/contact/); contact the chair by sending an e-mail to pjcc_chair@physics.ox.ac.uk; email us by clicking on our names on the Committee page; or simply talk to your "year rep" or someone else on the committee directly. All your comments will be taken seriously and can be handled anonymously if you want to. If you are interested in playing a bigger role and directly participating in PJCC meetings as a committee member (where you'll get free sandwiches!), please contact the PJCC Chair at the above email.

It is important that people contact us so that we can get a balanced set of views. If you have a problem or a good idea, please do let us know; that way things can be improved (or we can at least give you an explanation if they can't).

Even if they don't have any other involvement in the PJCC, **each term every physics student fills in a web-based questionnaire about the lectures they have attended**. The results, including marks for various categories and a summary of the comments for each lecturer, are collated and passed on to the department. The comments are not displayed and remain anonymous, so please take this opportunity to tell us what you think. The completion of these questionnaires is extremely important for the department, as the results are taken seriously. The minutes of all previous meetings are displayed on the PJCC webpage.

The PJCC webpage (https://pjcc.physics.ox.ac.uk/) also contains useful links, with reading recommendations, good physics websites, and (perhaps most notably) student-written lecture notes courtesy of Toby Adkins). There are also some links to help you find vacation placements.

EPILOGUE

Well, that's it – Oxford First Year Physics in a nutshell! If you still have questions after reading this and the Undergraduate Handbook, then your first points of contact should be your college tutor or the PJCC Chair (gareth.hopkins@sjc.ox.ac.uk). Please also feel free to reach out to Carrie Leonard-McIntyre, the Assistant Head of Teaching (carrie.leonard-mcintyre@physics.ox.ac.uk) with any administrative queries you might have.

Good luck!

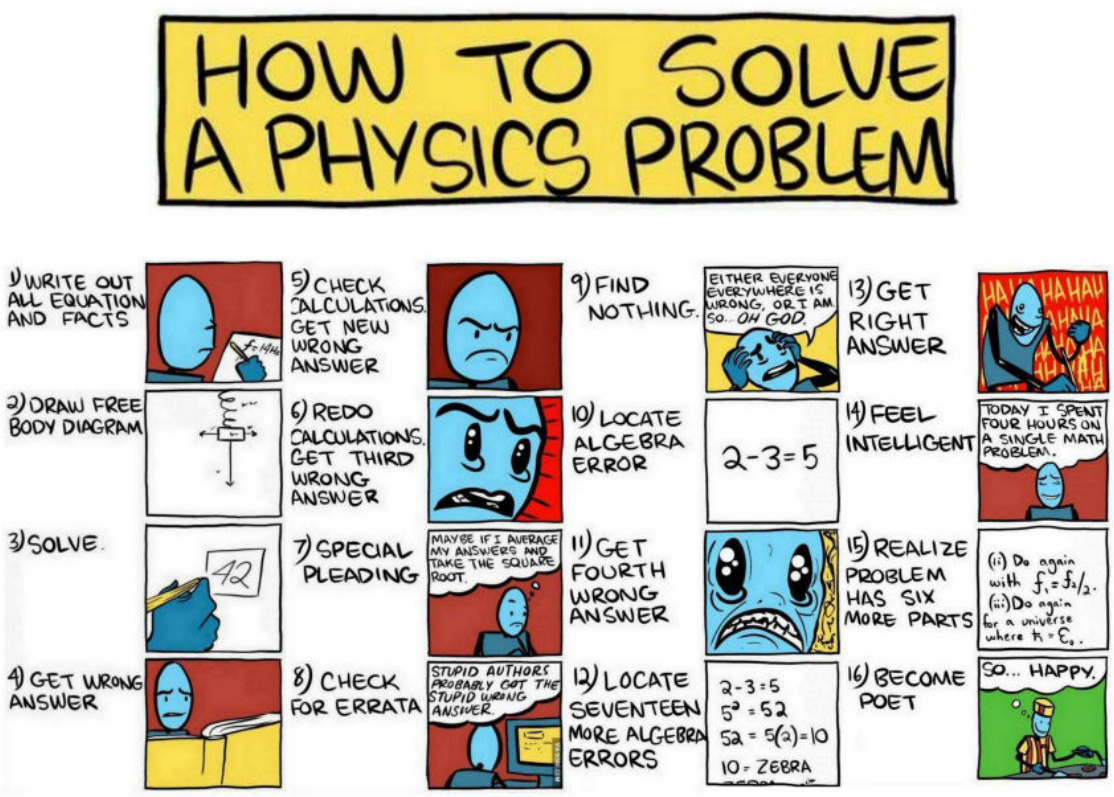

Figure 3: smbc-comics.com