1st Year Modules

PX101: Quantum Phenomena, 2019-2020

This year, this module was online only with no exam, and only consisted of learning out of Young and Freedman, which was mostly fine, since the content isn't too difficult. The module itself is really interesting, giving you a first look at the Schrodinger equation, and particle in a box, etc. introducing some fascinating concepts. Additionally, the module bridges really nicely to PX262, which is the second year quantum module, so it's well worth learning this content well!

PX120: Electricity and Magnetism, 2019-2020

E&M is always such an intimidating module, but it's not too bad overall. The lectures can be quite intense but it's just because everything is done very rigorously and explicitly. Erwin's notes are brilliant and have loads of useful maths at the beginning which does come in handy, and the problem sheets are mostly nice, with lots of optional but helpful problems. Similar to PX101, this module bridges quite nicely to PX263, which is the second year electromagnetic theory module. You learn about Maxwell's equations in this module, and they are so useful and used very often in PX263 (in a slightly different form though). Overall, it seems like a difficult module, but after going through some past papers and problem sheets, you should be sorted for the exam.

PX145: Physics Foundations, 2019-2020

Foundations is a nice module; a lot of the early content is familiar from A-Levels and it's really interesting. The lectures are great, and Jon is a fantastic lecturer, however there are no written notes for this module which is a bit of a shame. That being said, most stuff from this module is covered in Young and Freedman, so if you get a bit confused then you can always look in there. Come exam season, just stay on top of the problem sheets, use the problems in Y&F, and do lots of past papers and you should be fine.

PX147: Introduction to Particle Physics, 2019-2020

This was a fun module, and Steve was a brilliant lecturer. The lectures were great, and the written notes are fantastic as well. There are some links to the Special Relativity section of PX148 in this module, so they go quite nicely together. Out of the two optional modules for first year, I chose this one because I wasn't too bothered about astronomy, and I thought that particle physics would be more interesting. The exam can be tricky for this module, so revise well by making use of the problem sheets and past papers.

PX148: Classical Mechanics and Special Relativity, 2019-2020

This was by far my favourite module in first year. The lectures were amazing - David is a great lecturer, his notes are brilliant and clear, and the content is interesting. The problem sheets and Mastering Physics can be really difficult at times though. Not much else to say here – was a great module and would definitely recommend to any Maths students thinking of taking it, since there is a lot of maths involved. To help with revision, there are lots of useful bits in Young and Freedman, loads of practice problems etc., so definitely make use of it!

PX149: Maths for Physicists, 2019-2020

This was a great module in terms of the content. Literally everything in this module will crop up at some point during your physics degree, and this module really bridges the gap between A-Level and university physics. If you didn't take Further Maths at A-Level then most of the Term 1 content will

be completely new to you. But, answering the problem sheets as you go along and making a good set of notes from the lectures will really help you. For our year, Bogdan lectured Term 1 and he had an amazing set of written notes, with loads of examples and explanations. Term 2 was lectured by Nicholas and his lectures were decent, but the content was substantially more difficult than the first term. I think a set of written notes would have really helped for Term 2 content, but this might not be the case if the lecturer has changed. Overall, this was a decent module and all of the content is really useful for future physics. The Term 1 exam can be quite difficult, so practice time management for it, but the Term 2 exam is usually a bit easier.

PX150: Physics Programming Workshop, 2019-2020

This was a decent module and can be some really easy marks if you're interested in Python. For me this was my first proper encounter into programming, so I found it quite confusing at the beginning, but there is a nice set of written notes that definitely help, and the workshops help if you're stuck with a problem. Bridges nicely into PX277, which is the second year programming module.

2nd Year Modules

PX262: Quantum Mechanics and it's Applications, 2020-2021

This is the second year quantum mechanics module and for me this was the most intimidating module, but also the most interesting and probably my favourite module. Builds up from the stuff learnt in the first year quantum module and goes into way more detail. Gavin lectures Term 1, and Julie lectures Term 2. Gavin's material was in the form of a Moodle book and mini-lectures each week (thanks to online learning), but it was a really effective way of learning and I personally found his content more interesting than Julie's.

Term 1 is a lot of formal quantum mechanics, and recapping previously seen stuff, so there's quite a lot of maths and new concepts to get your head around. Term 2 was lectured only with online lectures, and the content is relatively straightforward, but it's quite a lot of condensed matter physics, which I find quite boring – that's just me though! The module is assessed with 15% online Moodle quizzes which weren't too difficult, and 85% exam. In general, just do all the problem sheets and the past papers, and if there are any topics that you find confusing (trust me, there will be), find a QM textbook in the library and have a quick read.

PX263: Electromagnetic Theory and Optics, 2020-2021

This was another intimidating module, but it's lectured extremely well and the written notes that go along with the lectures are amazing. Nicholas lectured this year and his videos were top notch; nice explanations, nice layout, and decent length. The written notes are excellent and go well beyond the scope of the course. This module is assessed similarly to Quantum Mechanics, in that 15% is assessed with online Moodle quizzes (again, they weren't too difficult), and 85% in the exam. For this, you need lots of vector identities and vector calculus, so make sure you're up to date on that.

PX264: Physics of Fluids, 2020-2021

Fluids was such a great module, Tony is a brilliant lecturer. The lecture material seems really quite difficult but the exam papers aren't nearly as bad. The problem sheets are handy for revision, and Tony does lots of recapping so you can stay caught up with everything really easily. At the end of the module, he also gives you a full set of equations and explains everything nicely. Fluids is assessed completely through the exam, and it was overall a great module!

PX265: Thermal Physics II, 2020-2021

Thermal Physics II concentrates on statistical mechanics and a little bit of thermodynamics. Stat mech seems quite daunting to most people but you'll do this module in term 2, and by that time you'll have finished term 1 quantum, and I think this really helped me understand stat mech more. There are a few similarities between them, i.e., measurements are probabilistic rather than deterministic, and there's lots of simple harmonic oscillators used in thermal. I really liked the lectures, and the problem sheets and written notes are amazing, really good module overall. Papers can be a bit tricky but if you do all the problems and past exams you'll be set. Also, 15% of the module is made up of online Moodle quizzes, which were a bit tricky, but a nice way to grab a few guaranteed marks! The rest is made up from the exam.

PX267: Hamiltonian Mechanics, 2020-2021

Hamiltonian was quite an intimidating module; everyone says you need to be amazing at maths for it and etc. but overall I really enjoyed it. It was a term 1 module, so come exam time, you'll probably want to leave yourself a bit of extra time to prepare for it, since you'll need to recap more. It is true that you need a fair bit of maths for this module, but it's not too difficult, lots of differentiation, coordinate systems and algebra (I think there are a couple of amazing revision guides for those first two). This module is assessed completely through the exam, but the past papers weren't too bad, and there are loads of practice problem sheets to do.

PX275: Mathematical Methods for Physicists, 2020-2021

The second year maths module was quite a tough module overall, but was still interesting and completely necessary for literally every other module. You do lots of vector calculus, multivariable calculus, partial differential equations, Fourier transforms, and you'll use all of these techniques all the time throughout your degree. Lectures were good for both terms, and the lecturers are really helpful. This module is assessed 20% through coursework (homework and Moodle quizzes), and 80% through the exam. The homework and Moodle quizzes can be a really good way to get easy marks, and take a bit of pressure off the final exam. The final exam can be quite tricky, this is probably the only module where I'd recommend trying questions from a textbook, as well as using the problem sheets and past papers. Riley, Hobson and Bence is the best book possible for this, I'd recommend doing problems from the sections that you feel weakest in (this was multivariable calculus for me).

PX277: Computational Physics, 2020-2021

I liked this module, because it is all coursework and you can grab some nice marks here. This is the second year python module and is made up of 20% of Coderunner assignments (like in the first year), and the rest from Jupyter Notebooks. The latter will probably be completely new to everyone, but essentially, they're long problems that you have to write a long program to solve. Lots of equation solving, and lots of graph plotting here. It's not too difficult, the main things I recommend are to actually watch the lectures (I thought I'd get away without watching them), read the lecture notes well, and DO NOT leave the Jupyter assignments to the last minute. I think I wrote like 150 lines of python for one of the assignments, and you don't want to be doing that right up to the end!

PX280: Environmental Physics, 2020-2021

Environmental was a new module for our year, and it is a combination of an old module, electrical power generation (EPG), and some new content about the environment and the climate. You do the EPG section in term 1 and the rest in term 2. EPG stuff is quite simple, you should have seen a fair part of it from A-Levels, but there are some new derivations and new equations that you'll need to

get your head around. The term 2 content is interesting; talks about climate models, global warming, and radiation. It's assessed completely through the exam, and it might be a bit trickier to prepare for, only because of the lack of past papers for this module. I'd recommend doing the EPG papers (they should still be up on the Warwick Past Papers site), and doing all of the term 2 practice problems.

3rd Year Modules

PX384: Electrodynamics, 2020-2021

Core for MPhys, but optional for BSc. This module was hard if I am honest and you need a very good grasp of electromagnetism, and it also introduces some hard maths like tensors and four vectors. I would say the exams are quite similar though. The lecturer is changing for your year and so the module might end up slightly different. You basically just combine special relativity with electromagnetism.

PX440: Maths for Physics III, 2020-2021

Again, core for MPhys but optional for BSc. This is a standard maths module taught similarly to the other maths modules except much shorter. You do a section on calculus of variations which will be very familiar to those who did Hamiltonian in second year, then a section on complex analysis (just functions with complex numbers in them) and then finally a section on the calculus of residues. I did think the module was standard, but it also felt very out of place as the maths taught in it literally comes up in zero other third year modules, unlike the maths from previous maths modules which crops up everywhere.

PX385: Condensed Matter Physics, 2020-2021

Huge module, but also probably my personal favourite from this year. There is an enormous amount of content so if there is any module you choose to revise close to exams, make sure it isn't this one. Fortunately, I would say the content is consistently interesting. The lecturer is also very good, explains the concepts very well and tries to make the lectures fun. Nothing in this module is very difficult either, so it's always a good choice.

PX395: The Standard Model, 2020-2021

This module is pretty good all round, it's essentially a continuation of the first year particle module but in way more depth now you have a better understanding of quantum mechanics. It's not very maths-y either, if you like that. The lecturer will show you a lot of hard maths but it isn't required for the exam and so the module doesn't feel like it's easy while you learn it. You essentially do a pretty in-depth study of each of the fundamental forces but this time with QM involved.

PX366: Statistical Physics, 2020-2021

This module was, in my opinion and a lot of my friends' opinions, the hardest module we studied this year. It did have a nice exam, but it was also the lecturers first year teaching it, so I can't comment on how consistently nice the exam might be. The content is quite difficult to get your head around and it features a lot of maths. It feels like a continuation of Thermal Physics II, and you'll study phase transitions, fluctuations and randomness. The lecturer does a good job and it's fairly interesting, but difficult.

PX370: Optoelectronics and Laser Physics, 2020-2021

This module might have been removed this year, but I'll review it just in case. This is an easy module that had a surprisingly tough exam. You learn about how you can use light in circuits, as well as lasers. It was standard, and the lecturer is good. Not sure what else to say for it.

PX388: Magnetic Resonance, 2020-2021

Also, think this might have been removed. If you did the NMR lab report in second year, just imagine that as an entire module where you study the theory with some basic QM. Again, easy but I will admit, I found some sections to be not the most interesting. Also had a surprisingly tough exam.

PX389: Cosmology, 2020-2021

I am not really into space, so I didn't enjoy this module that much, but I think if you like space then you'll probably like this module. Again, tough exam but not so difficult lectures. You will look at how the universe changes through time and the curvature of the universe. It has got some geometry, a little bit of easy maths and some Astro stuff. Not for me, but I would recommend it if you enjoyed the other space modules.

PX391: Non-Linearity, Chaos and Complexity, 2020-2021

A module that is mostly just maths, but none of the maths is very difficult at all. You spend a lot of the module solving non-linear ODE's and looking at basic chaos theory and some emergent behaviour, which is much easier than it sounds, it's just learning some new methods of solving things you've mostly seen already. I did not find this module very interesting, but I do know people who did so it could just be my preferences. The lecturer is good at explaining the ideas presented though.

PX396: Nuclear Physics, 2020-2021

I thought this module had interesting content, was easy to understand and has nice exams. The lecturer explains concepts mostly well. You will look at the usual nuclear stuff in more depth. The only part of the module I strongly dislike is the last few lectures where you look at nuclear safety, which is another repeat of GCSE physics where you learn about burying waste, etc. But other than that, the content is pretty good. My only other complaint is that sometimes, equations and results are pulled out of nowhere but it is quite hard to derive them so I can't blame the lecturer at all for this.