Corpus Christi College Oxford

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I hope that your A levels, or equivalent, were not too stressful, and that you are able to relax a little now! Enclosed is some work which forms a prelude to the first year of the Physics course. Based on previous years' experience, we think that there are two areas where some preparatory work is very necessary, **Mechanics and Mathematics.** You will find that the Physics course at Oxford is more mathematically demanding than your A level course was. We designed the course so that it can be successfully tackled by students who have not done Double Maths at A-level, but Single Maths people may find the first year few weeks slight more demanding. Even if you have done Double Maths, you will begin to meet new material very soon in the first term; it is very important not to think that you know it all! Therefore it is essential that, whatever your A levels, your Maths is "up and running" when you arrive here.

On the Physics side, the first subject that you will tackle is Mechanics, which makes use of a significant amount of Maths (differential equations, vectors, complex numbers, etc). We scheduled the Mechanics course right at the start to give you an early opportunity for applying newly acquired knowledge (Maths) to a different subject (Physics). You will quickly understand the importance of making cross links between lecture courses rather than treating topics in a modular, isolated fashion. Thinking in an integrated and inclusive manner is going to be a very important skill to acquire, and one that is highly valued by employers.

We have selected two sets of problems in Maths and Mechanics ("**Vacation Work: Maths & Mechanics**" and "**Additional Physics Preparation Work**") which you should do in the vacation **before** coming to Oxford. Your answers to these problems will be collected shortly after you arrive (typically before Thursday of 0th week). Prepare and hand in separate Maths and Physics (note that all "Mechanics" are Physics topics) scripts, as different Tutors will deal with these topics. Before embarking on the Physics course you should be very familiar with the following topics in Mathematics:

Integral and differential calculus of simple functions (x^n, *sin, cos, tan, sec, cot, cosec, log, exp, sinh, cosh, tanh, coth,* etc.).
Coordinate geometry of these functions and simple curves and surfaces (hyperbola, parabola, quartic, ellipse, circle, etc.).
Expansions of *sin* (A+B), *cos*(A+B), formulae for half angles.
Vectors and matrices.
Theorems of De Moivre, Taylor, Maclaurin, and their applications.

You should certainly consult a few books on Mathematics and check that the material mentioned here doesn't look unfamiliar. In addition, much of the above is covered in the mathematical textbooks listed in the reading list (see web page pointer below).

During the course of your studies, you will find that there are certain textbooks to which you will have to refer very regularly, and it will be very useful to purchase your own copies of these as you go along. Many will be available second-hand in Oxford; however, you may have relatives / friends / teachers who have studied physics fairly recently, and who are prepared to let you have or buy some of their old textbooks. You may also live near a university town where finalists are selling off their libraries. With this in mind, I have enclosed a list of books to which you will need to refer during your undergraduate career; the books which are most essential are marked with a double asterisk. If you keep receipts for your purchases, the College will refund part of the price later in the year.

A recent reading list is attached, and the 2018/19 version can be found on the internet when it becomes available: http://www2.physics.ox.ac.uk/students/undergraduates in "Undergraduate Handbook", most likely as "Appendix A". These lists are only for guidance and they are updated regularly. There may also be texts that a lecturer proposes as late as at the beginning of a lecture course. Many lecturers (but not all) provide their own notes to supplement books and the library at Corpus holds a vast range of physics texts. The material you learn in your first year will be examined in four core papers (CP1, CP2, CP3, and CP4) and a short option paper (S1 or S2 or S3).

Please do not hesitate to contact me if you have any questions. Professor Johnston and I are looking forward to working with you in the autumn; in the meantime I hope that you have an enjoyable summer.

Hans Kraus

Prof Hans Kraus **Fellow and Tutor in Physics**

Corpus Christi College Merton Street Oxford OX1 4JF
T 01865 276700 **DL** 01865 273361 **F** 01865 276767 **E** hans.kraus@physics.ox.ac.uk www.ccc.ox.ac.uk