



# UNIVERSITY OF CAMBRIDGE

Faculty of Mathematics

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## MATHEMATICS WITH PHYSICS

This guide is intended for students who are considering applying to Cambridge to read mathematics.

The information contained here is only a rough guide. Further general information about admissions can be found in the University Undergraduate Admissions Prospectus obtainable from the Cambridge Admissions Office, Student Services Centre, New Museums Site, Cambridge, CB2 3PT, telephone 01223 333 308, e-mail: [admissions@cam.ac.uk](mailto:admissions@cam.ac.uk), or from individual colleges, see <https://www.undergraduate.study.cam.ac.uk>

More specific information can be obtained by writing to or e-mailing individual colleges.

Further information about the mathematics course can be found in the *Guide to Admissions* booklet, see <https://www.maths.cam.ac.uk/undergrad/admissions/undergraduate-admissions>

All the documentation is available on the Mathematics Faculty website at <https://www.maths.cam.ac.uk>.

# Mathematics with Physics

In the first year of the Cambridge undergraduate mathematics course (the Mathematical Tripos), there are two options:

- (a) Pure and Applied Mathematics;
- (b) Mathematics with Physics.

Mathematics with Physics is a first year course only. At the end of the first year, you can either continue with the Mathematical Tripos or change to the Natural Sciences Tripos (Advanced Physics and Mathematics options, for example) for the remaining two years of your BA degree.

You may want to consider the Mathematics with Physics option if either:

- you are mathematically inclined but intend to study theoretical physics;
- or
- you are not sure whether to specialise in mathematics or in physics.

You should not apply for Mathematics with Physics on the grounds that it sounds less mathematical than the Pure and Applied Mathematics option: the mathematical criteria for admissions to these two options are the same.

If you are not particularly mathematically inclined, or if you want to study two other experimental subjects besides physics (chemistry, for example) as well as mathematics, then you should apply instead to study Natural Sciences.

The Mathematics with Physics option consists of courses given by the Faculty of Mathematics, which provide about three-quarters of the total workload, and courses given by the Physics department, including practical work, which provide the remaining quarter of the workload. The physics lectures provide a series of short courses on Dynamics, Rotational Mechanics and Special Relativity, Oscillating Systems, Waves and Quantum Waves, and Gravitational and Electromagnetic Fields. (These are the same as those in the first-year Physics component of the Natural Science Tripos.) The mathematical lectures are on Vectors and Matrices, Groups, Differential Equations, Vector Calculus, Analysis and Probability. The Faculty ensures that students of Mathematics with Physics are able to attend the lectures for both the Mathematics with Physics option and the Pure and Applied Mathematics option.

Mathematics with Physics is examined at the end of the first year. The examinations consist of four three-hour papers, three of which are common to all options. The fourth paper taken by candidates for the Mathematics with Physics option is the Physics paper from the Natural Sciences Tripos.

You should state on the Cambridge application form if you want to do the (one-year) Mathematics with Physics course. However, since this course is an option within the Mathematical Tripos, it is normally possible to be flexible: you may well change your mind before your interview or after discussing the matter at interview, or even part of the way through the course once you arrive.