

Maths – Student Suitability

What is Mathematics?

Maths is one of the core subjects which is compulsory in every school. Project Maths, the current leaving cert curriculum, provides students with the opportunity to gain an understanding of and familiarity with several branches of mathematics, as well as developing their overall appreciation of the subject. The branches, or 'strands' in question have been chosen because they have applications in everyday life, are useful in other disciplines, and provide a foundation for further education. As a result, maths is very accessible to students at all levels.

As a wide-ranging subject with many fields and applications, mathematics gets used everywhere, and everyone can find some use for it. For students it opens doors to careers. For citizens it enables informed decisions. For nations it provides knowledge to compete in a technological community. No longer just the language of science, mathematics contributes in direct and fundamental ways to business, finance, health and defence. Whether it's managing your monthly budget or a part of your job, mathematics has a place in everyone's life.

What level of Mathematics would be suitable for me?

Mathematics is available for study at three levels, Foundation, Ordinary, and Higher, and each level covers everything in the levels below it. Students are encouraged to study at the level appropriate to their needs and aspirations. There are many careers which require or benefit greatly from having a higher level of mathematics, and it's a good idea to research these before coming to a decision.

Aiming for Higher Level:

Mathematics at higher level is designed to suit the needs of all students, whether they're continuing their study of mathematics to third level, studying it as a compliment to another subject (such as Business or Physics), or just looking for points. The course familiarises students with the ideas of abstraction and rigorous proof, giving learners a feeling for the great mathematical concepts that span many centuries and cultures, as well as covering practical everyday topics which students are meeting in their lives outside school.

Higher level maths is considered the most time consuming subject of all and often requires more hours of study than other subjects to get a good result. The course is demanding, but very rewarding, both in terms of intellectual achievement and potential career paths opened. Worldwide, and particularly in Ireland there is huge demand for students who are technically capable, and higher level mathematics trains students in exactly the skills they'll need to succeed.

From a careers perspective, students considering a career in any area of science, medicine, engineering, business, or finance should be studying higher level maths if at all possible, as large portions of the higher level course will be reviewed or assumed at third level. There are of course many other careers and courses which benefit from a knowledge of higher level maths.

Some examples of courses that require higher level maths for entry: Chemistry and molecular modelling TCD, Computer Science TCD, Economics and finance UCD, Industrial biochemistry UL, Actuarial Studies: DCU, UCD.

Aiming for Ordinary Level:

At ordinary level, students are offered mathematics that is meaningful, relatively accessible, and chosen with the understanding that many of them may go on to use and apply mathematics in their future careers, and all of them will meet the subject to a greater or lesser degree in their daily lives. The course starts with practical and familiar problems, and gradually introduces more abstract ideas, leading towards the use of academic mathematics in the context of further study.

Most Leaving Cert students sit the ordinary level maths exam, often dropping down from higher level having become more aware of their ability level and due to increased pressure in sixth year. **Tip:** The most important thing to consider is how much time you are spending on higher maths and if you are spending too much time and only capable of a D grade, maybe this time could be better spent on other subjects you are stronger in.

Passing ordinary level maths is extremely important, as the majority of CAO courses require at least a D3; and students who don't meet this requirement are often left with few to no third level education options.

Aiming for Foundation Level:

At foundation level, mathematics is about developing maths as a body of knowledge and skills that makes sense, and can be used in many different ways as good method of solving problems and finding answers. It's intended to equip learners with the knowledge and skills required in everyday life, and it is also intended to lay the groundwork for learners who may proceed to further studies in areas in which specialist mathematics is not required.

The course focuses primarily on fundamental skills and providing a basic but solid understanding of mathematical concepts which will remain relevant and useful in the future. As well as numerical problems, students can also expect to be presented with visual and spatial questions, as well as some theory.

Taking foundation maths has the disadvantage of making many CAO courses inaccessible, which may have serious implications for students considering third

level education. However, more and more courses are now accepting foundation level maths.

There are approximately 500 courses around the country that accept foundation level maths.

Bonus Points:

The higher education institutions have introduced a bonus scheme for higher level Leaving Certificate maths whereby an additional 25 points will be added to an applicant's points score. This means that a D3 will equal 70 points, and an A1 will equal 125 points. Failing grades do not merit bonus points.

Waterford Institute of Technology have introduced a 'second-chance' exam for students who do not pass Leaving Cert maths, which is sufficient to enter some of their courses which require mathematics.

Subject Content:

Project Maths divides the course into five 'strands' of maths which are studied at all levels, in greater depth at higher levels. These are:

- **Statistics and Probability** aims to provide an understanding what probability is and why concepts such as variation and uncertainty are important. Students will also learn how to analyse statistics such as those in newspapers, business reports, and scientific data, so that they can draw meaningful and relevant conclusions.
- **Geometry and Trigonometry** deals with shapes such as circles and triangles, both on the coordinate plane and otherwise. The skills developed here are useful in areas such as architecture, landscape design, and agriculture, as well as visual design and spatial reasoning.
- **Number** Learners continue to make meaning of the operations of addition, subtraction, multiplication and division of whole and rational numbers and extend this sense-making to complex numbers.
- **Algebra** This strand builds on the relations-based approach of junior cycle with its five main objectives:
 - to make use of letter symbols for numeric quantities
 - to emphasise relationship based algebra
 - to connect graphical and symbolic representations of algebraic concepts
 - to use real life problems as vehicles to motivate the use of algebra and algebraic thinking
 - to use appropriate graphing technologies (graphing calculators, computer software) throughout the strand activities.

Learners build on their proficiency in moving among equations, tables and graphs and become more adept at solving mathematical and real-world problems.

- **Functions** This strand builds on the learners' experience in junior cycle where they were formally introduced to the concept of a function as that which involves a set of inputs, a set of possible outputs and a rule that assigns one output to each input. The relationship between functions and algebra is further emphasised and learners continue to connect graphical and symbolic representations of functions.

They are introduced to calculus as the study of how things change and use derivatives to solve various kinds of mathematical and real-world problems. They learn how to go from the derivative of a function back to the function itself and use such methods to solve various geometric problems, such as computation of areas of specified regions.