

**Advanced Higher Maths**

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| **What are the aims of this course?**The course will extend students mathematical skills, knowledge and understanding in a way that recognises problem solving as an essential skill. You will be encouraged to challenge your thinking and decision making to solve problems and integrate mathematical knowledge. |
| **What are the recommended entry levels for this course?**Entry onto the Advanced Higher course will be in discussion with the department and will be based on the student’s final grade being usually an A or B at Higher Mathematics. |
| **What content is included in this course?**The course is made up of three units, Mathematics 1, 2 and 3.

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| **Use mathematical operational skills linked to methods in algebra and calculus by:**1. Applying algebraic skills to partial fractions
2. Applying calculus skills through techniques of differentiation
3. Applying calculus skills through techniques of integration
4. Applying calculus skills to solving differential equations
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| **Use of mathematical operational and reasoning skills linked to applications of algebra and calculus****by:**1. Applying algebraic skills to the binomial theorem and to complex numbers
2. Applying algebraic skills to sequences and series
3. Applying algebraic skills to summation and mathematical proof
4. Applying algebraic and calculus skills to properties of functions
5. Applying algebraic and calculus skills to problems
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| **Use of mathematical operational and reasoning skills linked to geometry, proof and systems of equations by:**1. Applying algebraic skills to matrices and systems of equations
2. Applying algebraic and geometric skills to vectors
3. Applying geometric skills to complex numbers
4. Applying algebraic skills to number theory
5. Applying algebraic and geometric skills to methods of proof
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| **What skills will I develop?**The study of Advanced Higher Mathematics develops logical reasoning, analysis, problem-solving skills and the ability to think in abstract ways, as well as offering opportunities for creativity. It is a rich and stimulating subject with the capacity to engage and fascinate learners and has a wide applicability to science, engineering, technology, business, industry and not least to everyday life. Mathematics is an ever expanding body of knowledge, skills, concepts and techniques essential in the efficient handling of information and the solution of problems. |
| **What learning and teaching approaches will I experience?**The course will be teacher led, with students being actively involved in learning through practical work. Emphasis is placed on problem solving, as it is essential that students develop a systematic approach to the solution of problems and learn to communicate their results in a meaningful way.It must be stressed that students will be required to do work in their own time to reinforce the work done in class, as well as homework tasks.  |
| **How will I be assessed?**The SQA external assessment consists of a final exam of 2 papers. Paper 1 is non-calculator and paper 2 is longer and a calculator allowed. A prelim, which is of the same form as the SQA external exam, takes place in January under exam conditions. |
| **What are the homework requirements?**Homework will be set to practise the skills that have been learnt during lessons, and to assess the students understanding of a particular topic, so that additional time may be spent revising a topic if needed.A student will be expected to do a minimum of 4-5 hours’ work a week, this will consist of homework and consolidation work. |
| **What are the possible progression routes?**This course is a good general introduction to university mathematics and as such is essential preparation for courses in physics, chemistry, computing science, finance and engineering at university. In addition, it provides a good grounding in some numerical techniques used in wider fields of study. |

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