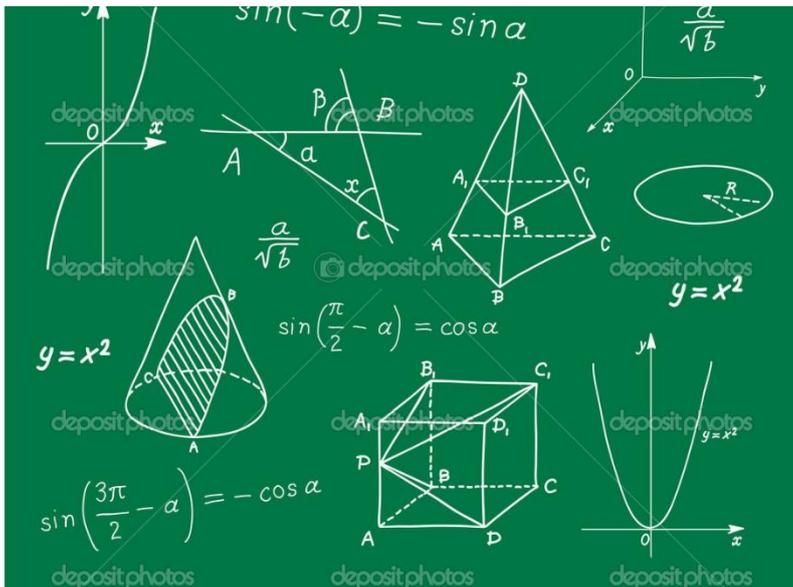


# ADVANCED HIGHER MATHEMATICS



## Aims

Mathematics is important in everyday life, allowing us to make sense of the world around us and to manage our lives. Using Mathematics enables us to model real-life situations and to make connections and informed predictions. It equips us with the skills we need to interpret and analyse information, simplify and solve problems, assess risk and make informed decisions.

The Course aims to enthuse, motivate and challenge learners by enabling them to:

- select and apply complex mathematical techniques in a variety of mathematical situations, both practical and abstract
- extend and apply skills in problem solving and logical thinking
- extend skills in interpreting, analysing, communicating and managing information in mathematical form, while exploring more advanced techniques
- clarify their thinking through the process of rigorous proof.

## Progression into this Course

Entrance to this course is at the discretion of the centre. Learners would normally be expected to have attained the skills and knowledge required by the following or by equivalent experience:

Higher Mathematics at A or B or relevant component Units.

## Progression from this course/Careers

This course or its units may provide progression to other University qualifications in Mathematics or related areas, further study, employment or training.

## Course Unit Description

### 3 Mandatory Units

Methods in Algebra and Calculus

Applications of Algebra and Calculus

Geometry, Proof and Systems of Equation

## Course Assessment

### Description

#### Methods in Algebra and Calculus

The general aim of the unit is to develop advanced knowledge and skills in algebra and calculus that can be used in practical and abstract situations to manage information in mathematical form. The outcomes cover partial fractions, standard procedures for both differential calculus and integral calculus, as well as methods for solving both first order and second order differential equations. The importance of logical thinking and proof is emphasised throughout.

#### Applications of Algebra and Calculus

The general aim of the unit is to develop advanced knowledge and skills that involve the application of algebra and calculus to real-life and mathematical situations, involving applications of geometry. Learners will acquire skills in interpreting and analysing problem situations where these skills can be used. The outcomes cover the binomial theorem, the algebra of complex numbers, properties of functions, rates of change and volumes of revolution. Aspects of sequences and series are introduced, including summations, proved by induction.

#### Geometry, Proof and Systems of Equation

The general aim of the unit is to develop advanced knowledge and skills that involve geometry, number and algebra, and to examine the close relationship between them. Learners will develop skills in logical thinking. The outcomes cover matrices, vectors, solving systems of equations, the geometry of complex numbers, as well as processes of rigorous proof.

The external assessment will take the form of an examination of duration **three hours** with a total of **100 marks**.

The examination will test the candidate's ability to retain and integrate mathematical knowledge across the component units of the course. The examination will consist of a balance of short questions designed mainly to test knowledge and understanding, and extended response questions which also test problem solving skills. These two styles of questions will include ones which are set in more complex contexts to provide evidence for performance at grades A and B.