Syllabus 9709 AS Mathematics – Papers P1 (Pure Mathematics 1) and P2 (Pure mathematics 2)

Recommended Prior Knowledge. Students should have achieved at least a grade C at O-level or IGCSE in Mathematics.

General Resources

Cambridge University Press has published a series of textbooks created specifically for the CIE syllabus. The recommended books for this course are :-
▪ Pure Mathematics 1   ISBN 0 521 53011 3
▪ Pure mathematics 2&3   ISBN 0 521 53012 1

Internet sites. There are a number of appropriate sites covering both this and the later A2 syllabus. Those general sites that can be recommended are:-
• AS Guru (www.bbc.co.uk/education/asguru/maths) – an excellent site published by the BBC aimed specifically at students taking AS examinations.
• BBC GCSE Bitesize (www.bbc.co.uk/schools/gcsebitesize/maths) – a comprehensive, pupil friendly revision site for students taking AS mathematics with only grade C at O level or IGCSE.
▪ Autograph - Graph Plotter (www.chartwellyorke.com/autograph.html) . A revolutionary aid to the teaching of calculus and coordinate geometry.

UNITS

1 P1	**Algebra.** An in-depth study of functions (Topic 2), including the quadratic function, the solution of simultaneous and quadratic equations (Topic 1) and a study of arithmetic and geometric series (Topic 7). Approximately 20% of the AS course.
2 P1	**Coordinate Geometry and Calculus**. The coordinate geometry of the straight line (Topic3), leading to the gradient of a curve and to the introduction of differentiation (Topic 8) and integration (Topic 9). Approximately 25% of the AS course.
3 P1	**Trigonometry and Vectors**. Radian and Circular Measure (Topic 4) .The graphs of the basic trigonometric functions, identities and equations (Topic 5). Simple vector algebra and the use of vectors to calculate lengths and angles (Topic 6) Approximately 15% of the As course.
4 P2	**Algebra**. The modulus function, polynomial functions of degree 3 or 4, logarithmic and exponential functions and the solution of equations involving these functions (Topics 1 and 2). Extending the solution of a cubic equation to the numerical solution of an equation by an iterative method (Topic 6). Approximately 15% of the AS course.
5 P2	**Calculus** (Topics 4 and 5) The differentiation and integration of simple trigonometric, exponential, logarithmic and composite functions. Differentiation of products, quotients and functions defined implicitly or parametrically. Use of the trapezium rule to estimate the value of a definite integral. Approximately 15% of the AS course.
6 P2	**Trigonometry** (Topic 3). The properties and graphs of all six trigonometric functions. The use of addition formulae for double angle identities and for expressing $a \sin \vartheta + b \cos \theta$ as $R \sin(\theta \pm \alpha)$ or $R \cos(\theta \pm \alpha)$. Approximately 10% of the AS course.

Please note that the units outlined above are not of equal size. They have been designed to provide coherent topics that will take students through the AS course in a logical and ordered way. A very approximate weighting is given with each unit.

TEACHING ORDER

The order suggested below will vary depending upon the structure of the teaching resources in any one particular school. Two particular teaching structures are catered for;

- A - the situation where one member of staff is teaching the whole course,
- B - the situation where the two components (P1 and P2) are being taught by different members of staff (as in many schools). This is not an easy option as the two parts of the AS syllabus, for P1 and P2, are very much inter-related. It will be necessary for teachers to liaise on a regular basis to make this particular situation successful.

In both the above cases, it is suggested that Unit 1 be taught first to give a good general algebraic background for other units that will follow. Note however that the work on series is independent and could be covered later in the course. Unit 2 should follow – it is the longest and most important part of the syllabus. Unit 4 must come after Unit 1, Unit 5 after Unit 2 and Unit 6 after Unit 3.

Therefore, although it may be preferable to cover Units 1 to 6 in order, a suitable alternative is to cover the units in the order 1,4,2,5,3,6.