Syllabus 9709 AS Mathematics – Papers P1 (Pure Mathematics) and M1 (Mechanics 1)

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 endorsed by CIE and created specifically for the CIE syllabus. The endorsed books for the P1and M1 course are :-
- Pure Mathematics 1   ISBN 0 521 53011 3
- Mechanics 1   ISBN 0 521 53015 6

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.

A site recommended for use with Unit 4 is:-
- **www.physicsclassroom.co/Class/newtlaws/newtltoc.htlm**

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 (Topic 3), 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 M1	**Motion and Force**. Graphical and numerical ideas of velocity and acceleration (Topic 2). Force (Topic 1) and its relation to acceleration through Newton's laws of motion.(Topic 3) . Approximately 30% of the AS course.
5 M1	**Energy, Work and Power**. General concepts behind the conservation of energy. Work and its relationship to energy. Power as rate of doing work. 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 M1) are being taught by different members of staff (as in many schools).

Even in case A there will be the occasional topic which will need teaching out of order, simply because of the need for its inclusion in a different unit. Such cases are highlighted with an asterisk.

A. 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 needs an introduction of calculus, so follows naturally from Unit 2. Unit 3 is independent of the other units and Unit 5 must follow on from Unit 4.

B. Teacher of Pure maths: Should follow the same order as in "A" (i.e. Units 1, 2 and 3 in order) except that the simple principles of differentiation and integration could be required at an earlier stage.

   Teacher of Mechanics.: Should start with Unit 4, but leave the ideas of variable acceleration until later in the course. Unit 5 follows naturally from Unit 4.