



September 2009

To students/parents of students studying Mathematics A Level

Welcome to the Mathematics A Level course. You will find that this course contains much material that will be useful in a whole host of the sciences. Mathematics is offered as a Single subject, as part of a Joint degree, or as a vital part of 422 courses at Degree level in Great Britain alone. It has elements, which are used in a whole host of careers ranging from Accountancy and Archaeologists to Surveyors and Town Planners. Thus it is important that you understand all parts of the course.

There are several items below that range from extremely useful to vital. It is very important that this information is taken on board.

**1. Tests will be set throughout the course to examine understanding of the material.** A **vital** set of tests will be set just before Autumn half-term to ascertain whether students are capable of completing at least the AS part of the course. This will consist of basic AS Level material from the course. If a student does not pass this particular set of tests, they will have **one further chance** to re-take a similar test just after half-term. *Failure in the retake would lead to being dropped from the course. All students have been informed of this when registering for the course.*

All students **must** pass all three modules in the summer and hence obtain a pass overall. Failure in any one of the three modules would lead to not being permitted to continue into the Upper sixth – although modules may be retaken with the student paying for the entrance of the retake papers.

**2. Absence from lessons.** Some students will invariably be absent from lessons through illness or necessary trips once in a while over the time of the course. **Students will normally be expected to catch up with all missed work and assignments within 1 week of their return after the absence.**

- a) Absence known in advance: Request work that will be missed from teachers before absence;
- b) Short unexpected absence: Request work missed from the teacher immediately on return;
- c) Protracted absence: keep in regular contact with their teacher to stay up to speed with the course.

In extreme cases, students who fall too far behind may be instructed to leave the course if the student has also made scant attempt to catch up.

**3. Teachers will obviously give as much assistance as possible throughout the course.** In return, we expect all assignments to be attempted so that we are all working towards the same goal – to obtain the best result possible for you in this subject. Failure to attempt assignments may result in a student being sent to a study area to complete the work before being readmitted to class. Repeated failure after warnings may result in a student being instructed to leave the course.

#### 4. Below I have listed the topics that will need to be covered:

| Certification Title and Number                     | Units Required   |
|--|--|
| Advanced Subsidiary GCE Mathematics (3890)         | C1 & C2 together with one of M1, S1, D1  |
| Advanced Subsidiary GCE Pure Mathematics (3891)    | C1, C2 and FP1   |
| Advanced Subsidiary GCE Further Mathematics (3892) | FP1 together with two other units which may not include any of C1, C2, C3, C4                                    |
| Advanced GCE Mathematics (7890)                    | C1, C2, C3, C4 together with <b>either</b> two from M1, S1 D1 <b>or</b> M1, M2 <b>or</b> S1, S2 <b>or</b> D1, D2 |
| Advanced GCE Pure Mathematics (7891)               | C1, C2, C3, C4, FP1 and either FP2 or FP3  |
| Advanced GCE Further Mathematics (7892)            | FP1 together with FP2 or FP3 or both, plus three or four other units as appropriate.                             |

Weighting of each unit is equal and all units are externally assessed by a written examination of duration 1 hour 30 minutes with 72 marks available on each paper. Question papers will be designed to have a gradient of difficulty with the more demanding questions towards the end of the paper

#### Module Content Summary

| <b>Pure Mathematics</b>   |  |
|---|--|
| Core Mathematics 1 (C1) (4721) (AS)   | Indices & Surds (including rationalising the denominator of the form $a + \sqrt{b}$ ); Polynomials (expansion of brackets, quadratics, quadratic inequalities, simultaneous equations, completing the square); Coordinate Geometry & Graphs (circle equation $(x-a)^2 + (y-b)^2 = r^2$ and $x^2 + y^2 + 2gx + 2fy + c = 0$ ); Differentiation; |
| Core Mathematics 2 (C2) (4722) (AS)<br>(C1 knowledge assumed)                                 | Trigonometry (Sine & cosine rules, $\frac{1}{2}ab \sin C$ , radians, graphs, elementary identities, surd values); Sequences and series including sigma notation; expansion of $(a + b)^n$ ; Factor & Remainder theorems; Logarithms; Integration   |
| Core Mathematics 3 (C3) (4723) (A2)<br>(C1 & C2 knowledge assumed)                            | Algebra & Functions; Transformation of graphs; Trigonometry; Differentiation & Integration including product, quotient & chain rule; Numerical methods (Simpson's rule)  |
| Core Mathematics 4 (C4) (4724) (A2)<br>(C1, C2, C3 knowledge assumed)                         | Rational functions and graphs; Binomial expansion; Differentiation & Integration (including calculus of trig functions); First order differential equations; vectors (including dot product etc.)  |
| Further Pure Mathematics 1 (FP1) (4725) (AS)<br>(C1, C2 knowledge assumed)                    | Summation of series; Proof by induction (including finding the nth power of a 2x2 matrix); Roots of polynomial equations; Complex numbers; Matrices (including transformation matrices & solution of 3 simultaneous equations with 3 unknowns)   |
| Further Pure Mathematics 2 (FP2) (4726) (A2)<br>(C1-C4 & FP1 knowledge assumed)               | Rational functions & Graphs; Polar coordinates (including integration); Hyperbolic functions; Differentiation & Integration; Numerical methods (including Newton-Raphson method)   |
| Further Pure Mathematics 3 (FP3) (4726) (A2)<br>(C1-C4 & FP1 knowledge assumed - but not FP2) | Differential equations; Vectors (including vector product etc.); Complex numbers (including de Moivre's theorem); Groups   |
| <b>Mechanics</b>  |  |
| Mechanics 1 (M1) (2637) (AS)  | Force as a vector; Equilibrium of a particle; Kinematics of motion in a straight line; Newton's laws of motion; Linear momentum.   |
| Mechanics 2 (M2) (2638) (A2)  | Centre of mass; Equilibrium of a rigid body; Motion of a projectile; Uniform motion in a circle; Coefficient of restitution and impulse; Energy, work and Power.   |

| <b>Statistics</b>                                |  |
|--|--|
| Probability and Statistics 1 (S1)<br>(2641) (AS) | Representation of data; Probability; Discrete Random Variables; Bivariate data   |
| Probability and Statistics 2 (S2)<br>(2642) (A2) | Continuous Random Variables; The Normal Distribution; The Poisson Distribution; Sampling and Hypothesis testing.   |
| Probability and Statistics 3 (S3)<br>(2643) (A2) | Continuous random variables; Linear combinations of random variables; Confidence intervals and the $t$ distribution; Difference of population means and proportions; the chi squared test. |

| <b>Discrete Mathematics</b>                |   |
|--|---|
| Discrete Mathematics 1 (D1)<br>(2645) (AS) | Algorithms; Graph Theory; Networks; Linear Programming. |

**5. Re: Permissible calculators for A Level examinations.** No calculators may be used in answering unit C1; for all other units candidates may use a graphic calculator if they wish. Computers, and calculators with computer algebra functions, are not permitted in answering externally assessed units.

Please complete and return the tear-off slip below to your Pure Mathematics teacher. As this material is of such importance, students will only be allowed to attend A Level Mathematics classes once the slip has been returned.

Yours sincerely,

**Mr. F.G.D. Tozzi**  
**Head of Mathematics**

I have received the details regarding tests, topics, assignments and permissible calculators. I understand that only certain calculators are permitted and that non-permitted calculators may need to be confiscated for the duration of an A Level examination.

Parent's Signature:..... Student Name:.....