

**Complex Numbers - Chapter 1 Core Pure 1 book**

1) Imaginary and complex numbers	
2) Multiplying complex numbers	
3) Complex conjugation	
4) Roots of quadratic equations	
5) Solving cubic and quartic equations	

**Argand diagrams - Chapter 2**

1) Argand diagrams	
2) Modulus and argument	
3) Modulus-argument form of complex numbers	
4) Loci in Argand diagrams	
5) Regions in the Argand diagrams	

**Matrices - Chapter 6**

1) Introduction to matrices	
2) Matrix multiplication	
3) Determinants	
4) Inverting 2x2 matrix	
5) Inverting 3x3 matrix	
6) Solving systems of equations using matrices	

**Linear transformations - Chapter 7**

1) Linear transformations in two dimensions	
2) Reflections and rotations	
3) Enlargements and stretches	
4) Successive transformations	
5) Linear transformations in three dimensions	

**Linear programming - Chapter 6 Decision 1 textbook**

1) Linear programming problems	
2) Graphical methods	
3) Locating the optimal point	
4) Solutions with integer values	

**The simplex method - Chapter 7**

1) Formulating a problem	
2) The simplex method	
3) Problems requiring integer solutions	
4) Two-stage simplex method	
5) The Big-M method	

**Critical path analysis - Chapter 8**

1) Modelling a project	
2) Dummy activities	
3) Early and late event times	
4) Critical activities	
5) The float of an activity	
6) Gantt charts	
7) Resource histograms	
8) Scheduling diagrams	

**Series - Chapter 3 Core Pure 1 book**

1) Sums of natural numbers	
2) Sums of squares and cubes	

**Proof by Induction - Chapter 8**

1) Proof by induction series	
2) Proving divisibility results	
3) Proving statements with matrices	

**Roots of Polynomials - Chapter 4**

1) Roots of a quadratic equation	
2) Roots of a cubic equation	
3) Roots of a quartic equation	
4) Expressions relating to the roots of a polynomial	
5) Linear transformations of roots	

**Vectors - Chapter 9**

1) Equations of a line in three dimensions	
2) Equations of a plane in three dimensions	
3) Scalar products	
4) Calculating angles between lines and planes	
5) Points of intersection	
6) Finding perpendiculars	

**Algorithms - Chapter 1 Decision 1 textbook**

1) Using and understanding algorithms	
2) Flow charts	
3) Bubble sort	
4) Quick sort	
5) Bin packing algorithm	
6) Order of an algorithm	

**Graphs and Networks - Chapter 2**

1) Modelling and networks	
2) Graph theory	
3) Special types of graphs	
4) Representing graphs and networks using matrices	
5) The Planarity algorithm	

**Algorithms on Graphs - Chapter 3**

1) Kruskals algorithm	
2) Prim's algorithms	
3) Applying Prim's algorithms to a distance matrix	
4) Using Dijkstra's algorithm to find the shortest paths	
5) Floyd's algorithm	

**Route Inspection - Chapter 4**

1) Eulerian graphs	
2) Using the route inspection algorithm	
3) Networks with more than four nodes	

**The Travelling Salesman problem - Chapter 5**

1) The classical and practical travelling salesman problem	
2) Using a minimum spanning tree method to find an upper bound	
3) Using a minimum spanning tree method to find a lower bound	
4) Using nearest neighbour to find an upper bound	

Assesments:  
January  
June

Teacher A

**Discrete random variables - Chapter 1 Further Statistics 1 textbook**

1) Expected value of a discrete random variable	
2) Variance of a discrete random variable	
3) Expected value and variance of a function of X	
4) Solving problems involving random variables	

**Poisson distributions - Chapter 2**

1) The Poisson distributions	
2) Modelling the poisson distribution	
3) Adding Poisson distributions	
4) Mean and variance for Poisson	
5) Mean and variance for Binomial distributions	
6) Using Poisson to approximate to the binomial	

**Geometric and negative Binomial distributions - Chapter 3**

1) The geometric distribution	
2) Mean and variance of geometric distributions	
3) The negative binomial distribution	
4) Mean and variance of the negative binomial distribution	

**Hypothesis Testing - Chapter 4**

1) Testing for the mean of a Poisson distribution	
2) Finding critical regions for Poisson distributions	
3) Hypothesis testing for the parameter p of geometric distributions	
4) Findign the critical regions fro a geometric distribution	

**Complex numbers - Chapter 1 Core Pure 2 book**

1) Exponential form of complex numbers	
2) Multiplying and dividing complex numbers	
3) De Moivre' theorem	
4) Trigonometric identities	
5) Sums of series	
6) nth root of a complex number	
7) Solving geometric problems	

**Hyperbolic Functions - Chapter 6**

1) Introducing hyperbolic functions	
2) Inverse hyperbolic functions	
3) Identities and equations	
4) Differentiating hyperbolic functions	
5) Integrating hyperbolic functions	

**Methods in differential equations - Chapter 7**

1) First order	
2) Second order homogeneous	
3) Second order non -homogeneous	
4) Using boundary conditions	

**Modelling with differential equations - Chapter 8**

1) Modelling with first order equations	
2) Simple harmonic motion	
3) Damped and forced harmonic motion	
4) Coupled first order simultaneous differential equations	

Teacher B

**Series - Chapter 2 Core Pure 2 book**

1) The method of differences	
2) Higher derivatives	
3) Maclaurin series	
4) Series expansions of compound functions	

**Chi -squared tests -Chapter 6 Further Statistics 1 textbook**

1) Goodness of fit	
2) Degrees of freedom and the chi squared test	
3)Testing a hypothesis	
4) Testing the goodness of fit with discrete data	
5) Using contingency tables	
6) Apply goodness of fit tests to geometric distributions	

**Central Limit Theorem - Chapter 5 Further Statistics 1 textbook**

1) The central limit theorem	
2) Applying the CLT to other distributions	

**Probability generating functions - Chapter 7 Further Statistics 1 textbook**

1) Probability generating functions	
2) PGF's of standard functions	
3) Mean and variance of a function	
4) Sums of independent random variables	

**Quality of tests - Chapter 8 Further Statistics 1 textbook**

1) Type I and Type II errors	
2) Finding Type I and Type II errors using the normal distribution	
3) Calculate the size and power of a test	
4) The power function	

**Polar coordinates - Chapter 5 Core Pure 2 textbook**

1) Polar coordinates and equations	
2) Sketching graphs	
3) Area enclosed by a polar curve	
4) Tangents to polar curves	

**Methods in Calculus - Chapter 3**

1) Improper integral	
2) The mean of a function	
3) Differentiating inverse trig functions	
4) Intergrating inverse trig functions	
5) Integrating using partial fractions	

**Volumes of revolution - Chapter 4**

1) Volumes of revolution around the x axis	
2) Volumes of revolution around the y axis	
3) Volumes of revolution of parametrically defined curves	
4) Modelling volumes of revolution	

Revision for Core 1 and 2, Decision and Further Statistics will take place at regular intervals throughout the course  
Students will also have to pre learn some key A2 Maths topic such as differentiation, integration, trigonometry and the normal distribution

Assesments:  
January - exam week