FURTHER MATHEMATICS

A LEVEL Year 12

TEACHER 1
CORE PURE (CP) AND DECISION (D) MATHS

1. D - ALGORITHMS
- Flow charts
- Bubble sort
- Quick sort
- Bin-packing

2. CP - COMPLEX NUMBERS
- Imaginary numbers
- Multiplying complex numbers
- Complex conjugation
- Complex roots

3. CP - ARGAND DIAGRAMS
- Modulus and argument
- Loci
- Regions

4. D - GRAPHS AND NETWORKS
- Modelling with graphs
- Graph theory
- Matrices
- The planarity algorithm

5. D - ALGORITHMS ON GRAPHS
- Kruskal's
- Prim's
- Dijkstra's
- Floyd's

6. D - ROUTE INSPECTION
- Eulerian graphs
- Route inspection algorithm
- Networks with more than 4 odd nodes

7. D - LINEAR PROGRAMMING
- Linear programming problems
- Graphical methods
- Locating optimal point
- Solutions with integer values

8. D - CRITICAL PATH ANALYSIS
- Modelling
- Dummy activities
- Early and late activities
- Critical activities
- Float
- Gantt charts

9. CP - VECTORS
- Equation of a line in 3 dimensions
- Equation of a plane in 3 dimensions
- Scalar product
- Angles between lines and planes
- Points of intersections
- Finding perpendiculars

TEACHER 2
CORE PURE (CP) AND FURTHER STATISTICS (FS)

1. CP - ROOTS OF POLYNOMIALS
- Quadratics
- Cubics
- Quartics
- Linear transformations of roots

2. CP - SERIES
- Sums of natural numbers
- Sums of squares and cubes

3. CP - PROOF BY INDUCTION
- Proving sums
- Proving divisibility
- Proving statements about matrices

4. CP - MATRICES
- Matrix multiplication
- Determinants
- Inverses
- Simultaneous equations

5. CP - LINEAR TRANSFORMATION
- Transformations in 2D
- Reflections and rotations
- Enlargements and shears
- Successive transformations
- Transformations in 3D

6. CP - VOLUMES OF REVOLUTION
- Around the x-axis
- Around the y-axis
- Adding and subtracting
- Modelling

7. FS - DISCRETE RANDOM VARIABLES
- Expected values
- Variance
- Functions of X

8. FS - POISSON DISTRIBUTION
- Modelling
- Adding
- Mean and variance
- Approximating binomial

9. FS - HYPOTHESIS TESTING
- Poisson
- Critical values

10. FS - CHI SQUARED
- Goodness of fit
- Degrees of freedom
- Contingency tables

11. FS - GEOMETRIC AND NEGATIVE BINOMIAL
- Geometric distribution
- Negative binomial
- Mean and variance
- Hypothesis testing

A LEVEL Year 13

TEACHER 1
CORE PURE (CP) AND DECISION (D) MATHS

1. D - TRAVELLING SALESMAN
- Classical problem
- Minimum spanning trees
- Nearest neighbour

2. CP - COMPLEX NUMBERS
- Exponential form
- Multiplying and dividing
- De Moivre's Theorem
- Trigonometric identities
- Sums of series
- Nth roots

3. D - CRITICAL PATH ANALYSIS
- Resource histograms
- Scheduling diagrams

4. D - SIMPLEX
- Linear programming
- Simplex method
- Two stage
- Big M method

5. CP - POLAR COORDINATES
- Equations
- Sketching curves
- Area
- Tangents

6. CP - METHODS IN CALCULUS
- Improper integrals
- Mean values
- Inverse trigonometric functions
- Partial fractions

7. CP - HYPERBOLIC FUNCTIONS
- Inverse
- Identities and equations
- Differentiating
- Integrating

TEACHER 2
CORE PURE (CP) AND FURTHER STATISTICS (FS)

1. CP - SERIES
- Method of differences
- Maclaurin series
- Series expansions

2. FS - PROBABILITY GENERATING FUNCTIONS
- Standard distributions
- Mean and variance
- Sums of independent variables

3. CP - VOLUMES OF REVOLUTION
- x and y axis
- Parametric
- Modelling

4. CP - METHODS IN DIFFERENTIAL EQUATIONS
- First order
- Second order
- Non-homogeneous
- Boundary conditions

5. CP - MODELLING WITH DIFFERENTIAL EQUATIONS
- Harmonic motion
- Damped and forced harmonic motion
- Coupled first-order simultaneous differential equations

6. FS - CENTRAL LIMIT THEOREM
- Normal distribution
- Other distributions

7. FS - QUALITY OF TESTS
- Type I and Type II errors
- Normal distribution
- Size and power