Y13FM Autumn Term	Pure: • Complex numbers (introduction, modulus and argument form, argand diagram and loci in the complex plane) • Matrices (introduction, matrices and transformations, invariance, determinants and inverses including of a 3x3 matrix) • Vectors and 3-D space (scalar and vector products, the vector equation of a line) • Proof by induction • Roots of polynomials (including complex roots) Statistics: • Probability including permutations and combinations • Discrete random variables • Discrete distributions (Binomial, Geometric, Uniform, Poisson) • Chi-squared tests (Contingency tables including Yates' correction and Goodness-of-fit tests) • Correlation (Pearson's product moment correlation coefficient and Spearman's rank correlation coefficient) • Linear regression • Continuous random variables • Continuous distributions (Normal, Uniform, Exponential) • Linear combinations of random variables • Hypothesis tests and confidence intervals • Non-parametric tests (Single sample, paired-sample and Wilcoxon rank-sum tests) Mechanics: • Work, energy and power • Impulse and momentum • Motion in a horizontal circle • Dimensional analysis • Centre of mass • Motion under a variable force • Motion in a vertical circle • Hooke's law • Linear motion under a variable force

	• Oblique impact
Y13FM Spring Term	Pure: • Series and induction (standard series, method of differences) • Lines and planes in space (including vector and cartesian equations of a plane and shortest distance problems) • Polar coordinates • Hyperbolic functions • Further calculus (differentiation of inverse trigonometric and hyperbolic functions, use of inverse trigonometric and hyperbolic functions in integration, using partial fractions in integration, volumes of revolution, mean value of a function) • Maclaurin series • First order differential equations (integrating factors) • Further Complex numbers (De Moivre's theorem, roots of complex numbers and their representation in the Argand diagram, complex numbers and trigonometry) • Second order differential equations (homogeneous, non-homogeneous and systems of differential equations)
Y13FM Summer Term	• Matrices and simultaneous equations • Simple harmonic motion, damping and damped oscillations • Revision