

KS5 Curriculum Overview: Y13 Further Maths

Rationale: In year 13, students look further into content covered in year 12. Students will continue to use the skills learnt and see where they can be used in the real world.

Term / Length of Unit		Outline	Assessment	Home Learning	Resources	Knowledge/Skills End Points	Reading
Autumn 1	Core Pure	C2 Series C3 Methods in calculus		Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	2.1 The method of differences 2.2 Higher derivatives 2.3 Maclaurin series 2.4 Series expansions of compound functions 3.1 Improper integrals 3.2 The mean value of a function 3.3 Differentiating inverse trigonometric functions 3.4 Integrating with inverse trigonometric functions 3.5 Integrating using partial fractions	Reading strategy: Go through key words and annotate worded problems. Books: Edexcel A level Further Mathematics Core Pure Mathematics Book 2 Textbook + e-book (A level Maths and Further Maths 2017) Euler's Pioneering Equation by Robin Wilson
	Decision	Revise C1 Revise 2.1 – 2.4 2.5 The planarity algorithm Revise 3.1- 3.4 3.5 Floyd's algorithm Revise 4.1- 4.1 4.3 Networks with more than 4 odd nodes C5 The travelling salesman problem	Test: Chapters 1 & 2	Set after every lesson. Assessed set every 2 weeks.	Textbooks, bank of assessed HL Qs.	Revise 1.1- 1.6 Revise 2.1 – 2.4 2.5 The planarity algorithm Revise 3.1- 3.4 3.5 Floyd's algorithm Revise 4.1- 4.1 4.3 Networks with more than 4 odd nodes 5.1 The classical and practical travelling salesman problems 5.2 Using a minimum spanning tree method to find an upper bound 5.3 Using a minimum spanning tree method to find a lower bound 5.4 Using a nearest neighbour algorithm to find an upper bound	Books: Edexcel AS and A level Further Mathematics Decision Mathematics 1 Textbook + e-book (A level Maths and Further Maths 2017) Key words: Planar Graphs, Odd & Even Degree, Vertex, Edge, Hamiltonian Cycle.
Autumn 2	Core Pure	C4 Volumes of revolution		Set after every lesson. Assessed	Textbooks, Dr Frost powerpoints,	4.1 Volumes of revolution around the x-axis	Reading strategy:

		C5 Polar coordinates	Test: Chapters 3 & 4	set every 2 weeks.	bank of assessed HL Qs.	4.2 Volumes of revolution around the y-axis 4.3 Volumes of revolution of parametrically defined curves 4.4 Modelling with volumes of revolution 5.1 Polar coordinates 5.2 Sketching curves 5.3 Area enclosed by a polar curve 5.4 Tangents to polar curves	Go through key words and annotate worded problems. Entomology of the word revolution. Books: Coordinate Geometry: Polar Coordinates Approach Hardcover – 30 Jan. 2005 by M.M. Tripathi Chalkdust magazine, Cardioids in Coffee Cups issue 6
	Decision	Revise C6 C7 The simplex algorithm Revise 8.1 – 8.6 8.7 Resource histograms 8.8 Scheduling diagrams	Test: Chapters 6 & 7 Test: Chapter 8	Set after every lesson. Assessed set every 2 weeks.	Textbooks, bank of assessed HL Qs.	Revise 6.1 – 6.4 7.1 Formulating linear programming problems 7.2 The simplex method 7.3 Problems requiring integer solutions 7.4 Two- stage simplex method 7.5 The Big- M method Revise 8.1 – 8.6 8.7 Resource histograms 8.8 Scheduling diagrams	Key words: Slack Variables, Simplex Method, Simplex Tableau, Artificial Variables, Surplus Variables & Inequalities.
Spring 1	Core Pure	C6 Hyperbolic functions C7 Methods in differential equations (part 1)	Test: Chapters 5 & 6	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	6.1 Introduction to hyperbolic functions 6.2 Inverse hyperbolic functions 6.3 Identities and equations 6.4 Differentiating hyperbolic functions 6.5 Integrating hyperbolic functions 7.1 First- order differential equations 7.2 Second- order homogeneous differential equations	Reading strategy: Go through key words and annotate worded problems. Entomology of the word hyperbolic. Key words: Hyperbolics.
	Further Mechanics 1	Revise 1.1- 1.2 1.3 Momentum as a vector Revise C2 C3 Elastic strings and springs	Test: Chapters 1 & 2 Test: Chapter 3	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	Revise 1.1- 1.2 1.3 Momentum as a vector Revise 2.1- 2.4 3.1 Hooke's law and equilibrium problems 3.2 Hooke's law and dynamics problem 3.3 Elastic energy	Books: Edexcel AS and A level Further Mathematics Further Mechanics 1 Textbook + e-book (A level Maths and Further Maths 2017) Surely You're Joking Mr Feynman by R.P Feynman

						3.4 Problems involving elastic energy	
Spring 2	Core Pure	C7 Methods in differential equations (part 2) C8 Modelling with differential equations	Test: Chapters 7 & 8	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	7.3 Second- order non- homogeneous differential equations 7.4 Using boundary conditions 8.1 Modelling with first- order differential equations 8.2 Simple harmonic motion 8.3 Damped and forced harmonic motion 8.4 Coupled first- order simultaneous differential equations	Reading strategy: Go through key words and annotate worded problems. Books: The Man Who Knew Infinity by R. Kanigel Entomology of harmonic.
	Further Mechanics 1	Revise C4 C5 Elastic collisions in two dimensions	Test: Chapters 3 & 4	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs.	Revise 4.1 – 4.4 5.1 Oblique impact with a fixed surface 5.2 Successive oblique impacts 5.3 Oblique impact of smooth spheres	Books: Symmetry and the Beautiful universe by Leon M. Lederman and Christopher T. Hill Key words: Homogeneous Oblique Harmonic
Summer 1	Core Pure	Revision	Maths dept PPEs (full papers)	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs, past papers		Reading strategy: Go through key words and annotate worded problems. Books: How to study for a Maths degree by Laura Alcock
	Decision and Further Mechanics 1	Revision	Maths dept PPEs (full papers)	Set after every lesson. Assessed set every 2 weeks.	Textbooks, Dr Frost powerpoints, bank of assessed HL Qs, past papers		Books: How to think like a Mathematician by Kevin Houston