1.11 Lower Sixth Further Maths A Level 22-23

(5) = Pearson Year 1 book Chapter 5. [5] = Pearson Year 2 book Chapter 5. (ap 5) – Pearson Year 1 applied book chp5. (Cam 3) = Cambridge FM pure year 1 book chp 3. [Hod 4] = Hodder FM pure year 2 book chp 4.

First term is about building key skills

Week	Topics A – Pure	Topics B – Pure and Mech	Topics C – Pure and stats
Throughout term recap with hwk:	**Triangle geom/trig/algebraic fractions**	**Surds/indices, quadratics – sketching, discriminant**	**Coordinate geom, proportionality, sim eqns**
1	Transforming graphs and sketching	Poly division/factor/remainder theorem and solving cubics	Review coordinate geometry (5) and circles (6)
2	Graph sketching – repeated **roots,** behaviour at infinity, dominant part	Surds/Indices/differentiation; incl First Principles. (12)	Inequalities – quadratics and 2D regions with curves (3)
3	Trigonometric Functions (10)	Applications of differentiation (12) NB: POI/concave/convex using 2nd deriv in week 12	Exp and logs: basic understanding, laws of logs and eqns (14.4-6)
4	Radians [5] [hand out yr2 book] sectors, arcs, equations, small angle approx	Modelling with diff (12)	e and lnx and their derivatives and graphs (14.1-3, 14.7)
5	Modulus/functions [2]	Integration (13)	Plotting log graphs (14.8)
6	Functions [2] Trig recip/inverse Fns [6]	Integration for finding areas (13)	Sequences and Series [3]
7	Trig: addition/double angle identities, proof, solving [7]	Differentiation [9.1-6]	Sequences and Series [3]
8	Trig: Rcos(theta+alpha) and trig graph modelling **[7]**	Differentiation [9.1-6]	Binomial Exp – n=1,2,3,... (8)
9	Trig consolidation [7]	Integration [11.1-11.3]	Binomial rational/-ve n [4]
10	Trapezium rule [11.9]	As above + 11.4 [~extension]	Parametric equations [8]
11	Iteration incl staircase/cobweb [10]	Implicit and parametric differentiation (9.8)	Parametric equations [8]
12	Newt-Raphs [10]	2nd deriv: POIs/concave/convex. Rates of change [9.9-10]	Algebra incl partial fractions [1] incl binomial exp but no integration
13	Review [10]/Consolidation	Review differentiation [9]	consolidation

Spring Term -

Week		Start mechanics	Start Stats
1	Test/Complex numbers intro (CP1 chp1)	SUVAT/travel graphs (ap 9)	Test/Start stats
2	Complex numbers	SUVAT/freefall	Stats – measures of spread incl var' and s.d/coding (Ap chp 2)
3	Complex numbers (CP1 Chp 5)	Projectiles [6]	Sampling (ap 1)/representation (ap 3) mostly gcse recap
4	Integration by PF [11.7]/int by sub [11.5]	Projectiles [6] + Vectors GCSE recap and use some question from (11) and [12]. SUVAT problems using vectors (Ap 10.1-2). https://tinyurl.com/3shcm5df	Regression (ap 4) just interpretation no need to find eqn of regression line on calc or otherwise. Conditional probability (ap 5)
5	Integration by sub incl trig [11.5]	Forces horizontal and vertical (10.3-6) incl pulleys	Discrete dist: uniform and general. excl. E(X) or Var(x). Binomial dist using calc and table (app 6)
6	Parametric Int/Int by parts [11.6]. Para Int – not in book see shared drive or old Edex' C4	Resolving forces incl friction and slopes [5]	Hyp test for bin (ap 7)
7	Volumes of revolutions	Resolving forces incl friction and slopes [7]	Regression [ap 1]
8	Diff Equations [11.10-11]	Application of forces [7] equilibrium problem, connected particles, slopes	Conditional prob – bayes theorem [app 2]/Normal dist[3]

9	Matrices (Cam 1) arithmetic, determinants, inverses up to 3x3	Moments [4]	Normal incl approx. to binomial [3.1-3.6] mostly with calc
10	Matrices (Cam 1)	Variable acceleration (11)/[8] incl vectors https://tinyurl.com/2h9tkkwx	Hyp test with normal (not incl CLT)

Summer term

Week			
1	Matrices (Cam 3) solve sim eqns, transformations up to 3D, invariance	Vectors (Cam 2) – scalar prod', line eqn,	Proof (4)+[1]
2			
3		Mechanics Consolidation	Consolidation of stats
4	Revision – all pure	Roots of polynomials – not in smr exam continued after test week	Revision – stats and might need to help mech teacher
5	Revision	Revision – only mech	Revision -
6	Revision	Revision	Revision –
7	Summer exams		
8	Induction (Cam 6) + (Hod 4) – matrices/inequalities	Roots and coeffs of poly equations up to quartics (Cam 5) + (Hod 3)	Induction (Cam 6) + (Hod 4) – basic, series, divisibility, differentiation
9/10	KE/UCAS		

U6 FM 22-23

1.12 Upper Sixth Further Maths (Pure) 22-23

(Cam 7) is Cambridge FM Core year 1 book chp 7. [Cam 5] is Cambridge FM Core year 2 book chp 5.
[Hod 5] is Hodder FM Core year 2 book chp 5.

Autumn Term

Week	Fp2. Hand out [Cam] and [Hod-if they don't have it]	Additional resources can be found here:
1	**Recap matrices** pupils covered FM AS Matrices (Hod 2+6)/(Cam 1+3) see review questions in [Hod] Recap inverses up to 2x2, solving sim' eqns, transformations 2D/3D, invariant lines. Recap 3x3 inverses and solving sim' eqns in week 4.	Old OCR FP1
2	**Recap AS FM Vectors** (Hod 7)/(Cam 2) see review questions in [Hod]	Old OCR FP1
3	Vectors [Cam 4.1-3]/[Hod 1 – vector eqn of plane missing]	[Hod 1] + Old OCR FP3
4	Vectors [Cam 5]/[Hod 2] including recap of using matrices to solve 3 sim' eqns	[Hod 2]
5	Maclaurin Series [Cam 8.1-2]	[Hod 6] + Old OCR FP2
6	Maclaurin Series [Cam 8.1-2] use [Hod 6] particularly ex6.2 q9	
7	Hyp Trig [Cam 6]	[Hod 7.1-2] Old OCR FP2
8	Hyp Trig [Cam 6] incl [Cam 7.2] now if you want	
9	Integration [Cam 7] inverse trig, inverse hyp trig, partial fractions	[Hod 4+7.3]
10	Integration [8.3-5]	[Hod 8]
11	Polar Coords [Cam 9]	[Hod 5]
12	Polar Coords [Cam 9]	Old OCR FP2
13	Consolidation/ pupils should recap complex numbers yr 1 use [Hod page 137-142]	

Spring Term

Week		
1	Test	
2	First order diff: Recap separable from single maths, [Hod 9.1-9.2] + int factors [Hod 9.3] or [Cam 10.2]. [Cam Ex10A worth skipping]	Old OCR FP3
3	Second order diff equations [Cam 10.3-4] or [Hod 12]	Old OCR FP3
4	Second order diff eqns: SHM and systems [Cam 11] or [Hod 12] forming doesn't appear to come up in OCR FM (it does in edexcel) so can skip this but would make nice enrichment	Old OCR FP3
5	Complex numbers [Cam 2]	[Hod 10]
6	Complex numbers [Cam 2]	
7	Complex numbers [Cam 2]	
8	Vectors: finding distances methods and formulae (Cam 4.4) + [Hod 11] good revision of vectors	
9	Revision using – new syllabus resources plus old resources such as:	
10	FP2 OCR (excl: rational fns,reduction formulae, sandwich inequalities with series and ints, y squared sketching) FP3 OCR (excl: groups)	

Summer term - Revision/exams

Core Pure papers from Edexcel/AQA are good for revision, the specs are very similar although not identical

1.13 Upper Sixth Further Maths (Mechanics) 22-23

[FMech Hod 7] is Hodder FM Mechanics book chp 7

Autumn Term

Week	Further Mechanics - Chapter 1-4 are recap of mech from year 1, use as necessary for lesson but mostly homework	Additional resources can be found here:
1	**Recap of chapters 1-4 [FMech Hod 1-4]**	NB: can be covered as homework
2	**Work, energy, power [FMech Hod 5] [FMech Cam 1]**	Old OCR M2 Cambridge book
3	**As above**	
4	Review roots of polynomials (CP1 3) was partly covered by mech teacher in L6 but neds to be reviewed	
5	**Impulse/momentum [FMech Hod 6] [FMech Cam 3]**	Old OCR M1 Cambridge book
6	Oblique Impacts [FMech Hod 14] [FMech Cam 8.2-3]	
7	**Dimensional analysis [FMech Hod 7] [FMech Cam 2]**	Old OCR M2 Cambridge book
8	**Circular Motion [FMech Hod 8] [FMech Cam 4]**	
9	Centres of Mass [FMech Hod 9 and 13] [FMech Cam 5+10]	
10	Centres of Mass [FMech Hod 9 and 13]	
11	Centres of Mass [FMech Hod 9 and 13]	
12	Motion under variable force [FMech Hod 10] [FMech Cam 7+8.1]	
13	Revision	

Spring Term

Week		
1	Tests	
2	Motion under variable force [FMech Hod 10] [FMech Cam 7+8.1]	
3	**Circular Motion 2: variable speed, vertical circles [FMech Hod 11] – for AS pupils need to know about vertical circles, see syllabus for more info.**	
4	**Circular Motion 2: variable speed, vertical circles [FMech Hod 11] [FMech Cam 9]**	Old OCR M3 Cambridge book
5	Hookes Law [FMech Hod 12]	
6	Hookes Law [FMech Hod 12]	
7	Revision	
8	Revision	
9	Revision	
10	Revision	

Summer term - Revision/exams

1.14 Upper Sixth Further Maths (Statistics) 23-24

[FStats 7] is Cambridge FM statistics book chp 7

Autumn Term

Week	Further Stats	Notes/Additional resources can be found here:
1	Combinatorics [FStats 1]	Old OCR S1 Cambridge book
2	Combinatorics [FStats 1]	IB HL exams/books
3	Method of differences/known series [Cam 13.-4] Some covered in L6 after summer exams.	[Hod 2]
4	As above	
5	Discrete RVs. Expectation and Var. [FStas 2]	
6	Poisson dist [FStats 3]	Old OCR S2 Cambridge book
7	Non-parametric testing/Wilcoxon rank sum test [FStats 4]	
8	Consolidation	
9	Correlation [FStats 4]	
10	Regression [FStats 5]	
11	Chi Squared tests [Fstats 6]	Exexcel Fstats
12	Continuous RVs [Fstats 7]	
13	Consolidation	

Spring Term

Week		
1	Continuous RVs [Fstats 7]	IB HL
2	Continuous RVs [Fstats 7]	Old OCR S2 Cambridge book
3	Combining RVs [FStats 8]	
4	Combining RVs [FStats 8]	
5	Hyp tests and Confidence Intervals [FStats 9]	
6	Hyp tests and Confidence Intervals [FStats 9]	
7	Revision	
8	Revision	
9	Revision	
10	Revision	

Summer term - Revision/exams