**A Level Further Maths, Core Pure Year 2**

**Exam Board: Edexcel**

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| **Term**  | **INTENT** | **IMPLEMENTATION** | **IMPACT**  |
| **Substantive Knowledge**This is the specific, factual content for the topic, which should be connected into a careful sequence of learning. | **Disciplinary Knowledge (Skills)**This is the action taken within a particular topic in order to gain substantive knowledge. | **Assessment opportunities**What assessments will be used to measure student progress?Evidence of how well students have learned the intended content. |
| **Autumn Term****1A****Year 13** | **Core Pure 2**Chapter 1: Complex numbers* 1.1 Exponential form of complex numbers
* 1.2 Multiplying and dividing complex numbers
* 1.3 De Moivre’s theorem
* 1.4 Trigonometric identities
* 1.5 Sums of series
* 1.6 $n $th roots of a complex number
* 1.7 Solving geometric problems

Chapter 2: Series* 2.1 The method of differences
* 2.2 Higher derivatives
* 2.3 Maclaurin series
* 2.4 Series expansions of compound functions

Chapter 3: Methods in calculus* 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
 | Chapter 1: Complex numbers* Express a complex number in exponential form
* Multiply and divide complex numbers in exponential form
* Understand De Moivre’s theorem
* Use De Moivre’s theorem to derive trigonometric identities
* Use De Moivre’s theorem to find sums of series
* Know how to solve completely equations of the form $z^{n}-a-ib=0$ giving special attention to the cases where $a=1 $and $b=0 $
* Use complex roots of unity to solve geometric problems

Chapter 2: Series* Understand and use the method of differences to sum finite series
* Find and use higher derivatives of functions
* Know how to express functions as an infinite series in ascending powers using Maclaurin series expansion
* Be able to find the series expansions of compound functions

Chapter 3: Methods in Calculus* Evaluate improper integrals
* Understand and evaluate the mean of a function
* Integrate rational functions using trigonometric substitutions

Integrate using partial fractions |  |
| **Autumn Term****1B****Year 13** | Chapter 4: Volumes of revolution* 4.1 Volumes of revolution around the $x $-axis
* 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

Chapter 5: Polar coordinates* 5.1 Polar coordinates and equations
* 5.2 Sketching curves
* 5.3 Area enclosed by a polar curve
* 5.4 Tangents to polar curves

Chapter 6: Hyperbolic functions* 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 functionsChapter 7: Methods in differential equations* 7.1 First-order differential equations
* 7.2 Second-order homogeneous differential equations
* 7.3 Second-order non-homogeneous differential equations
* 7.4 Using boundary conditions

Chapter 8: Modelling with differential equations * 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
 | Chapter 4: Volumes of revolution* Find volumes of revolution around the $x $ -axis
* Find volumes of revolution around the $y $ -axis
* Find volumes of revolution for curves defined parametrically
* Model real-life applications of volumes of revolution

Chapter 5: Polar coordinates* Understand and use polar coordinates
* Convert between polar and Cartesian coordinates
* Sketch curves with $r $given as a function of $θ $
* Find the area enclosed by a polar curve
* Find tangents parallel to, or at right angles to, the initial line

Chapter 6: Hyperbolic functions* Understand the definitions of hyperbolic functions
* Sketch the graphs of hyperbolic functions
* Understand and use the inverse hyperbolic functions
* Prove identities and solve equations using hyperbolic functions

Differentiate and integrate hyperbolic functionsChapter 7: Methods in differential equations* Solve first-order differential equations using an integrating factor
* Solve second-order homogeneous differential equations using the complimentary function and the particular integral
* Find particular solutions to the differential equations using given boundary conditions

Chapter 8: Modelling with differential equations* Model real-life situations with first-order differential equations
* Use differential equations to model simple harmonic motion
* Model damped and forced oscillations using differential equations
* Model real-life situations using coupled first-order differential equations
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| **Spring Term****2A****Year 13** | Additional Modules  | See specific module curriculum maps |  |
| **Spring Term****2B****Year 13** | Additional Modules | See specific module curriculum maps |  |
| **Summer Term****3A****Year 13** | Revision and Exams | Exam Technique and Exam Questions |  |
| **Summer Term****3B****Year 13** | Exams |  |  |