

**Introduction to the online Professional Learning Course for Further Maths Unit 4 (Pure).**

The course is split into six periods of study, each of two or three weeks, that will enable participants to study the content of the module and encounter possible teaching approaches in the comfort of their homes. This will be backed up by both the opportunity to email the tutor during the study period and a zoom meeting with the tutor at the end of each study period in which some exam style questions will be considered.

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| Study Period 1 | Power Series and Trigonometry | * Maclaurin Series
* General solution of trigonometric equations
* The factor formulae
* Using the $t=\tan(\left(\frac{x}{2}\right))$ substitution
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| Study Period 2 | Complex Numbers | * De Moivre’s Theorem
* Geometry of roots of unity.
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| Study Period 3 | Hyperbolic Functions | * Introducing the hyperbolic functions
* The Inverse Hyperbolic Functions
* Calculus of and with the Hyperbolic Functions
* The Catenary
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| Study Period 4 | Integration | * Partial Fractions
* Improper Integrals
* Further Integration
* Applications of Integration
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| Study Period 5 | Polar Co-ordinatesAnd Matrices | * Polar Co-ordinates: Basics
* Polar Co-ordinates: Calculus of Polar Curves
* Algebra with 3 × 3 matrices
* Simultaneous Equations
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| Study Period 6 | Differential Equations | * Integrating Factor
* 2nd order differential equations i
* 2nd order differential equations ii
* Applications
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The resources for each topic will be placed in a folder on Microsoft Teams.

The resources for each session include

* The flipped classroom videos which, although initially prepared for use by A-level students, will give a valuable overview of the concepts to be encountered.
* PowerPoints which develop the major concepts and illustrate them with fully worked solutions to examples.
* Exercises (with outline solutions) : participants are encouraged to work through at least some of these!
* Where appropriate, Geogebra files illustrating the concepts or providing animations of the physical situations.
* A final PowerPoint containing the questions that we will be considered during the zoom meeting: participants are encouraged to have a go at as many as possible of these before the session so that solution methods and any problems encountered can be discussed during the zoom meeting.

*An extract from the study material from the first session can be found ……….*