

Course Overviews DP (Maths SL) UWC Thailand 2017-2018

All units taught in grades 11 and 12 are continuously being developed and improved to best meet the needs of the students at UWCT. Therefore, the following overview is only a reflection of current plans for the course. Some changes to these course overviews may occur as a result of planning done throughout the academic year.

Grade	Time Frame	Unit number and title	Approaches To learning skills taught / learnt / developed in this unit	Content (topics / knowledge/ subject specific skills)	Connections to TOK	Summative assessment
11	4 weeks	Algebra - Sequences and Series Unit 1.1	Thinking skills - plan (have you identified if arithmetic or geometric and then used appropriate formulae) Self-management - managing time - (can you answer IB questions in time available, are students completing homework so as to be able to resolve queries)	<ul style="list-style-type: none"> Describe arithmetic sequences and series and geometric sequences and series How to find the sum of finite arithmetic sequences and series How to find the sum of geometric sequences and series Sigma notation 	How did Gauss add up integers from 1 to 100?	Test
11	4 weeks	Quadratics Unit 2.4	Research skills - GDC literacy (teach explicit use of GDC and graph interrogation)	<ul style="list-style-type: none"> The quadratic function $ax^2 + bx + c$; its graph, y-intercept, axis of symmetry Factorised form $a(x-p)(x-q)$ Vertex form $a(x-h)^2 + k$ 		Test
11	7 weeks	Functions I Units 2.1, 2.2, 2.5		<ul style="list-style-type: none"> Concept of function, domain and range Composite functions Inverse and identity functions The graph of a function Graph of inverse function f^{-1} as reflection in line $x=y$ Graph of reciprocal function $1/x$ Graph of rational function $\frac{ax+b}{cx+d}$ Vertical and horizontal asymptotes 	Is zero the same thing as 'nothing'?	Test
11		Exponentials and Logarithms Units 1.2, 2.6	Communication - written form (are your solutions sufficiently clear, have you used appropriate log rules so that your solutions are unambiguous)	<ul style="list-style-type: none"> Understanding of exponents and logarithms Work with exponents and logarithms in problems (Laws of exponents, Laws of logarithms, Change of base) How to use Pascal's Triangle in binomial expansions 	Are logarithms an invention or a discovery?	Test
11		Binomial expansion, and non-right angled trigonometry Units 1.3, 3.1, 3.2, 3.3, 3.6	Social skills - collaboration (sharing information to be able to derive the pythagorean identity)	Chapters 7, 8, 9 <ul style="list-style-type: none"> The binomial theorem Claculation of binomial coefficients The circle: radian measure, length of 	Which is a better measure of angle: radian or degree?	Test

				<ul style="list-style-type: none"> an arc, area of a sector • Solution of triangles: sine and cosine rule, area of a triangle, applications • The pythagorean identity • Double angle identities • Exact values of trigonometric ratios of specified angles (and multiples thereof) 		
11		Trigonometry and transformations of graphs Units 3.4, 3.5, 2.3		<ul style="list-style-type: none"> • Circular functions, domain, range, amplitude, period and their graphs • Composite functions of form $y = a \sin(b(x+c)) + d$ • Solving trig equations in a finite interval (graphically and analytically) • Quadratic equations in sin, cos or tan • Transformations of graphs - translations, reflections, vertical and horizontal stretches, composite transformations 	Trigonometry was developed by successive civilizations and cultures. How is mathematical knowledge considered from a sociocultural perspective?	Test
11		Vectors Units 4.1-4.4	Communication -	<ul style="list-style-type: none"> • Representation of a vector • Position vectors • Scalar product and angle between two vectors in 2 and 3 dimensions • Vector equation of a line • Point of intersection of two lines 	Who developed vector analysis; JW Gibbs or O Heaviside?	Test
11		Calculus - Differentiation Units 6.1 - 6.3		<ul style="list-style-type: none"> • Definition of derivative from first principles • Derivative interpreted as gradient • Tangents and normals, and their equations • Derivative of x^n, $\sin x$, $\cos x$, $\ln x$ and e^x • Chain, product and quotient rules • Second derivatives (and higher) • Max and min points • Points of inflection • Optimisation 	What value does the knowledge of limits have? Is infinitesimal behaviour applicable to real life?	End of school year test (OSA) which will incorporate this unit
12		Probability Unit 5.5, 5.6, 5.7, 5.8, 5.9	Thinking skills - plan (what diagram/method is most appropriate...venn/tree/prob. space...)	<ul style="list-style-type: none"> • Concepts of trial, outcome, equally likely outcomes, sample space, event • Complementary events • Use of venn diagrams, tree diagrams and tables of outcomes • Combined events • Mutually exclusive and independent events 	Is mathematics useful to measure risks? Can gambling be considered as an application of mathematics?	Test - probability Test - distributions

				<ul style="list-style-type: none"> • Conditional probability • Probabilities with and without replacement • DRV and their probability distributions, $E(X)$ for discrete data • Binomial distribution - including mean and variance • Normal distributions • Standardization of the normal distribution 		
12		Integration Units 6.4, 6.5, 6.6	Thinking skills - assess your understanding (can you check your integration by differentiating your solution? Shows understanding of differentiation skills)	<ul style="list-style-type: none"> • Integration as anti-differentiation • Indefinite integrals of x^n, $\sin x$, $\cos x$, e^x, and $1/x$ • Boundary condition(s) to determine constant of integration • Integration by substitution • Definite integrals (analytically and by technology) • Areas under and between curves • Volumes of revolution • Kinematic problems 	Zeno's Paradox	Test
12		Statistics Units 5.1, 5.2, 5.3, 5.4	Self-management skills - Communication - written form (explaining what the statistical calculations actually mean)	<ul style="list-style-type: none"> • Concepts of population, sample, discrete and continuous data • Presentation of data: tables, histograms, box and whisker plots, cumulative frequency graphs • Grouped data - use of mid interval values • Statistical measures and interpretations (central tendency and dispersion) • Effect of constant changes to the data • Applications • Linear correlation of bivariate data and correlation coefficient, r • Scatter diagrams with lines of best fit • Regression line 	How easy is it to lie with statistics? (TOK) The St Petersburg paradox (Int)	Test
12		Review	Self-management skills - planned revision (identifying strengths and areas for review) Self-management skills - affective skills - self motivation (working independently and seeking support outside of class to show self motivation)			
11 or 12	In lessons or weeks	From subject guide	Thinking Skills Communication skills Social skills	From subject guide	Ways of Knowing: Language Sense	Used in the gradebook

			<p>Self-management skills Research skills</p> <p>Inquiry Conceptual understanding Local and global contexts Teamwork and collaboration Differentiated Informed by assessment</p>		<p>Emotion Reason Imagination Faith Intuition Memory</p> <p>Areas of Knowledge: Mathematics Natural sciences Human sciences History The arts Ethics Religious knowledge systems Indigenous knowledge systems</p>	
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