

2017 UNIT 2 MATHEMATICAL METHODS SEMESTER 2 CURRICULUM PLAN

TERM 3		
WEEK	TOPIC	LEARNING FOCUS
Weeks 1 - 2	Logarithms CHAPTER 13 (C-I)	<ul style="list-style-type: none"> • 13 C, 13D • Convert between index and log statements • Simplify using \log_{10}, \log_e and other bases • Evaluate logarithmic expressions • Distinguish between exact values and approximate values • Simplify and solve equations using the 5 log laws and other logarithmic methods: eg $a^{\log_a x} = x$ and $\log_a(a^x) = x$ • Recognise the 'change of base' law • Sketch functions of the form $f: \mathbb{R}^+ \rightarrow \mathbb{R}$, $f(x) = \log_a(x)$, where $a > 1$, and the inverse function of $y = a^x$, • Apply basic graphical transformations of $y = \log_a(x)$ • Apply logarithmic scales
Weeks 3 - 4	Counting Methods (Combinatorics), Pascal's Triangle AND Binomial Theorem CHAPTER 10 (A - E)	<ul style="list-style-type: none"> • Become familiar with addition and multiplication principles • Apply factorial notation for permutations and combinations • Define and evaluate Permutations (Arrangements), n_{P_r} and Combinations (Selections), n_{C_r} (but not in circles) • Relate Combinations to Pascal's Triangle and the Binomial Theorem
Week 5	Discrete Probability Distributions CHAPTER 11 (A - C)	<ul style="list-style-type: none"> • Introduce the basic ideas of Discrete Random Variables • Become familiar with the concept of a Probability Distribution • Become familiar with the process of sampling with replacement (Binomial Probability Distribution) • Become familiar with the process of sampling without replacement (Hypergeometric Probability Distribution)
Week 6	CHAPTER 12 (A - C)	<ul style="list-style-type: none"> • CHAPTERS 9 -11 REVISION • OTHER REVISION
Weeks 7 - 9	Circular Functions CHAPTER 14 (A - O)	<ul style="list-style-type: none"> • Review Basic Trigonometry and the relationship of $\tan(x) = \sin(x)/\cos(x)$ • Understand unit circle definitions • Determine the exact value of trigonometric special angles • Convert between radians and degrees and determine arc length • Employ CAST, symmetry rules and complementary relations • Solve trigonometric equations including those of worded problems • Determine the amplitude, period or mean value of circular functions • Sketch graphs of circular functions • Apply transformations of sine and cosine graphs; • Employ the identity $\sin^2(x) + \cos^2(x) = 1$ • Calculate $\sin(x) \approx x$ for small values of x • Use inverse functions and transformations to solve equations of the form $Af(bx) + c = k$
Week 10	REVISION CHAPTER 15 (A - C)	<ul style="list-style-type: none"> • CHAPTERS 13 - 14 REVISION • OTHER REVISION

TERM 4		
WEEK	TOPIC	LEARNING FOCUS
Weeks 1-2	Differentiation CHAPTER 17 (A - D)	<ul style="list-style-type: none"> • Employ notations for the derivative of a function: $f'(x)$, dy/dx, $d/dx (f(x))$, $D_x(f)$ • Differentiate by First Principles • Differentiate by rule including power functions and simple polynomial functions • Become familiar with increasing and decreasing functions and gradient sign diagrams • Determine the gradient of a tangent to a curve at a point, via the derivative • Employ differentiation to solve problems
Week 3	Limits, Continuity AND Differentiability CHAPTER 17 (F -G)	<ul style="list-style-type: none"> • Become familiar with the concept of a limit • Evaluate limits including for hybrid functions and using CAS technology • Determine continuity and differentiability
Weeks 4 - 5	Applications of Differentiation CHAPTER 18 (A - F, H, I) CHAPTER 20 (E)	<ul style="list-style-type: none"> • Determine the equation of the tangent and normal at a given point on a curve. • Employ the derivative in rate of change problems • Apply derivatives to locating stationary points and determining their nature: maxima, minima and point of inflection • Sketch graphs employing Calculus • Apply derivatives to solving maximum or minimum problems • Apply derivatives to kinematics • Find a family of derivative functions for a given power or polynomial function • Determine the numerical approximation of roots of cubic polynomial functions using Newton's method.
Weeks 6 - 7	Antidifferentiation AND Applications of Antidifferentiation CHAPTER 17 (E) CHAPTER 18 (G) CHAPTER 20 (C) CHAPTER 21(B)	<ul style="list-style-type: none"> • Employ notation to determine an antiderivative • Antidifferentiate by rule including power functions • Applying antidifferentiation to rates of change or kinematics problems involving straight line motion • Find a family of derivative functions for a given power or polynomial function • Determine a specific antiderivative given a boundary condition
Week 8	CHAPTER 19 CHAPTER 22 CHAPTER 23	<ul style="list-style-type: none"> • CHAPTERS 16 - 18 REVISION • REVISION CHAPTER 20 - 21 • REVISION CHAPTER 1 - 22
Week 9	EXAMS	
	CHAPTER 20 (A,B,D,E)	<ul style="list-style-type: none"> • FURTHER CALCULUS.

