Course Outline for MCV4U

CALCULUS

Unit 1: Introduction to Calculus (Textbook Chapter 3)
Approx. # periods: 9

# periods	Topics	Practice Questions
1	Introduction to Limits: Investigation	
1	3.3 The Limit of a Function	
2	3.4 Properties of Limits	
1	3.1 The Slope of a Tangent	
1	3.2 Rates of Change	
1	3.5 Continuity	
2	Review & Evaluation	

Unit 2: Derivatives (Textbook Chapter 4)
Approx. # periods: 11

# periods	Topics	Practice Questions
1	4.1 The Derivative function	
2	4.2 Derivatives of Polynomial Functions	
2	4.3 Product Rule	
2	4.4 Quotient Rule	
2	4.6 Chain Rule	
2	Review & Evaluation	

Unit 3: Application of Derivatives (Textbook Chapter 5)
Approx. # periods: 12

# periods	Topics	Practice Questions
1	5.1 Implicit Differentiation	
1	Higher Order Derivatives	Handout
1	5.2 Velocity and Acceleration	
1	Max & Min on an Interval: Investigation	
2	5.4 Maximum and Minimum	
2	5.5 Optimization Problems	
2	5.6 Optimizing in Economics and Science	
2	Review & Evaluation	

Unit 4: Derivatives of Exponential, Logarithmic & Trigonometric Functions (Textbook Chapter 8 & Appendix A)
Approx. # periods: 9

# periods	Topics	Practice Questions
1	8.1 Derivatives of Exponential Functions	
1	8.2 Derivatives of $\ln x$	
2	8.3 Derivatives of General Exponential and Logarithmic Functions	
1	8.4 Optimization	
1	A2 Derivatives of Trigonometric Functions	
1	A3 Applications of Trigonometric Functions	
2	Review & Evaluation	

Unit 5: Curve Sketching (Textbook Chapter 9)
Approx. # periods: 7

# periods	Topics	Practice Questions
1	9.1 Increasing and Decreasing Functions	
1	9.2 Critical Points, Relative Maxima/Minima	
2	9.3 Asymptotes	
1	9.4 Concavity and Points of Inflection	
1	9.5 Curve Sketching	
1	Curve Sketching Evaluation	

ADVANCED FUNCTIONS (Red Textbook)
Geometry and Discrete Mathematics

Unit 1: Vectors (Chapter 4)
Approx. # periods: 6

# periods	Topics	Practice Questions
1	4.1 Vector Concepts	
1	4.2 Vector laws	
1	4.3 Force as a Vector	
1	4.4 Velocity as a Vector	
2	Review & Evaluation	

Unit 2: Algebraic Vectors and Applications (Chapter 5)
Approx. # periods: 8

# periods	Topics	Practice Questions
1	5.1 Algebraic vectors	
1	5.2 Operations with Algebraic Vectors	
1	5.3 The dot Product of 2 Vectors	
1	5.4 The Cross Product of Two Vectors	
2	5.5 Application of the Dot and Cross Product	
2	Review & Evaluation	

Unit 3: Lines in a Plane (Chapter 7)
Approx. # periods: 7

# periods	Topics	Practice Questions
1	7.1 Parametric and Vector Equations of a Line in a Plane	
1	7.2 Scalar Equation of a Line in a Plane	
2	7.3 Equation of a Line in 3-Space	
1	7.4 The Intersection of Two Lines	
2	Review & Evaluation	

Unit 4: Equations of Planes (Chapter 8)
Approx. # periods: 6

# periods	Topics	Practice Questions
1	8.1 & 8.2 Vector and Scalar Equations of a Plane in Space	
1	8.3 Intersection of a Line with a Plane	
1	8.4 Intersection of 2 Planes	
1	8.5 Intersection of 3 Planes	
2	Review & Evaluation	

ADVANCED FUNCTIONS (Purple Textbook)

Algebra and Geometry (McGraw-Hill Ryerson)

Chapter 1: Geometric Vectors

Approx. # periods: 8

# periods	Topics	Practice Questions
1	1.1 Directed Line Segments	
1	1.2 Adding and Subtracting Vectors	
1	1.4 Multiplying Vectors by Scalars	
1	1.5 Properties of Vector Operations	
1	1.3 Forces	
1	1.3 Velocity	
2	Review & Evaluation	

Chapter 3: Products of Vectors

Approx. # periods: 7

# periods	Topics	Practice Questions
1	3.1 Resolution of A Vector	
1	3.2 Vector Projections	
1	3.3 The Dot Product	
1	3.4 Applications of the Dot Product	
1	3.5 The Cross Product	
2	Review & Evaluation	

Chapter 4: Algebraic Vectors

Approx. # periods: 8

# periods	Topics	Practice Questions
1	4.1 Algebraic Vectors	
1	4.2 Vector Operations II	
1	4.3 The Dot Product II	
1	4.4 The Cross Product II	
1	4.x Volume of a Parallelepiped: Find the volume of the ‖pipeds: a) $\vec{u} = (1, 4, 3)$,	

	$\vec{v}=(2,5,6)$, $\vec{w}=(1,2,7)$; b) $\vec{u}=(-2,5,1)$, $\vec{v}=(3,-4,2)$, $\vec{w}=(1,3,5)$; c) $\vec{u}=(1,1,9)$, $\vec{v}=(0,0,4)$, $\vec{w}=(-2,0,5)$	
1	4.5 Linear Combinations of Vectors	
2	Review & Evaluation	

Chapter 5: Equations of Lines
Approx. # periods: 8

# periods	**Topics**	**Practice Questions**
1	5.1 Equations of Lines in $\mathbb{R}^2$	
1	5.2 Equations of Lines in $\mathbb{R}^3$	
1	5.3 Direction Numbers, Angles, and Cosines	
1	5.4 Scalar Equations of Lines in $\mathbb{R}^2$	
1	5.5 Intersection of Lines	
1	5.6 Distances Between lines	
2	Review & Evaluation	

Chapter 6: Equations of Planes
Approx. # periods: 10

# periods	**Topics**	**Practice Questions**
1	6.1 Equations of Planes	
1	6.2 Scalar Equations of Planes	
1	6.3 Intersection of a Line and Plane	
1	6.4 Intersection of Two Planes	
1	6.5 Intersection of Three Planes	
1	6.6 Solving Three Equations in Three Unknowns	
1	6.x Solving Linear Systems Using Matrices	
1	6.7 Classifying Systems of Linear Equations	
2	Review & Evaluation	