



CHRISTIAN HERITAGE COLLEGE

MT210

CALCULUS 3

This sample unit outline is provided by CHC for prospective and current students to assist with unit selection.

Elements of this outline which may change with subsequent offerings of the unit include Content, Required Texts, Recommended Readings and details of the Assessment Tasks.

Students who are currently enrolled in this unit should obtain the outline for the relevant semester from the unit lecturer.

Unit code	MT210
Unit name	Calculus 3
Associated higher education awards	Bachelor of Education (Primary) Bachelor of Education (Secondary) Bachelor of Arts/Bachelor of Education (Secondary)
Duration	One semester
Level	Advanced
Core/elective	Required for a minor in Mathematics
Weighting	Unit credit points: 10 Course credit points: Bachelor of Education (Primary) 320 Bachelor of Education (Secondary) 320 Bachelor of Arts/Bachelor of Education (Secondary) 320
Delivery mode	Face-to-face on-site
Student workload	<i>Face-to-face on site</i> Contact hours 30 hours Reading, study and assignment preparation 120 hours TOTAL 150 hours Students requiring additional English language support are expected to undertake an additional one hour per week.
Prerequisites/ co-requisites/ restrictions	<i>Prerequisite:</i> 20 credit points of 100-level Mathematics units
Rationale	A calculus course usually starts with the formula for a function and then computes its rate of change. Often in life the formula is the unknown that one desires to find. This is where differential equations are valuable. A differential equation relates some function (representing physical quantities) with its derivatives (rates of change). Because this relationship is extremely common in the physical world, reflecting the logical, dynamic and complex nature of its Creator God, differential equations play a significant role in many disciplines, including engineering, physics, economics and biology. Therefore, it is important to understand differential calculus and linear algebra. This unit extends the range of fundamental mathematical knowledge and skills available to enable students to analyse physical processes mathematically. Students will advance their understanding of differential equations, linear algebra and multivariable calculus and explore their applications in many contexts.
Prescribed text(s)	Anton, H., & Rorres, C. (2015). <i>Elementary linear algebra: Applications version</i> . (11th ed.). New York, NY: Wiley. Stewart, J. (2015). <i>Calculus: Early transcendentals</i> . (8th ed.). Boston, MA: Cengage Learning. Selected readings will be available via the Moodle™ site for this unit.

<p>Recommended readings</p>	<p>Adams, R.A., & Essex, C. (2013). <i>Calculus: A complete course</i>. (8th ed.). New York, NY: Pearson.</p> <p>Anton, H., Bivens, I., & Davis, S. (2012). <i>Calculus: Early transcendentals</i>. (10th ed.). New York, NY: Wiley.</p> <p>Beezer, R. (2013). <i>A first course in linear algebra</i>. (3rd ed.). New York, NY: Congruent Press.</p> <p>Kreyszig, E. (2011). <i>Advanced engineering mathematics</i>. (10th ed.). New York, NY: Wiley.</p> <p>Larson, R., & Edwards, B. H. (2013). <i>Calculus</i>. (10th ed.). Boston, MA: Cengage Learning.</p> <p>Lippman, D. (2012). <i>Math in society</i> (2nd ed.). Retrieved from http://www.opentextbookstore.com/mathinsociety/</p> <p>Stroud, K. (2011). <i>Advanced engineering mathematics</i>. (5th ed.). South Norwalk, CT: Industrial Press.</p> <p>In addition to the resources above, students should have access to a Bible, preferably a modern translation such as The Holy Bible: The New International Version 2011 (NIV) or The Holy Bible: New King James Version (NKJV).</p> <p>These and other translations may be accessed free on-line at http://www.biblegateway.com. The Bible app from LifeChurch.tv is also available free for smart phones and tablet devices.</p>
<p>Content</p>	<ol style="list-style-type: none"> 1. Differential Equations and Series: direction fields, first and second order linear ODEs, Taylor series, Fourier series, Euler's method 2. Multivariable Calculus: differentiation, derivatives, maxima/minima problems, line and work integrals, independence of path, Green's theorem 3. Linear Algebra: vectors, linear algebraic equations, eigenvalues and eigenvectors, vector dimensions, matrices, transformations
<p>Specialist resource requirements</p>	<p>Casio fx-82AU PLUS II scientific hand-calculator or equivalent</p>
<p>Learning outcomes</p>	<p>On completion of this unit, students will have demonstrated that they have:</p> <ol style="list-style-type: none"> 1. demonstrated a working knowledge and understanding of multivariable calculus, differential equations, and linear algebra; 2. developed and applied advanced mathematical skills to concepts of Differential Equations and Series, Multivariable Calculus and Linear Algebra to solve mathematical problems; 3. appreciated the logic, complexity and dynamic nature of mathematics in relation to its reflection of both the character of God and His creation; 4. applied critical and methodological rigour to effectively communicate mathematical concepts and arguments, using either written English or mathematical notations, as appropriate; and 5. communicated at an appropriate tertiary standard: with special attention to design elements, grammars, usage, logical relations, style, referencing and presentation.
<p>Assessment tasks</p>	<p>Task 1: Folio</p> <p>Word Length/Duration: 1 each week</p> <p>Weighting: 20%</p> <p>Learning Outcomes: 1, 2, 4, 5</p> <p>Assessed: Weekly</p> <p>Task 2: Investigation Report</p> <p>Word Length/Duration: 2,000 words</p> <p>Weighting: 30%</p> <p>Learning Outcomes: 1-5</p> <p>Assessed: Week 7</p>

	<p>Task 3: Examination</p> <p>Word Length/Duration: 3 hours</p> <p>Weighting: 50%</p> <p>Learning Outcomes: 1-5</p> <p>Assessed: Examination Week</p>
<p>Unit summary</p>	<p>This unit extends the range of fundamental mathematical techniques available to students to enable them to analyse physical processes mathematically. Students will advance their understanding of differential equations, linear algebra and multivariable calculus and explore their applications in many contexts.</p>

SAMPLE