

MATH 1014 MATHEMATICS 1A

Credit Points 10

Legacy Code 300672

Coordinator Alexander Lee ([https://directory.westernsydney.edu.au/search/name/Alexander Lee/](https://directory.westernsydney.edu.au/search/name/Alexander%20Lee/))

Description This Level 1 subject provides a solid foundation in the theory and applications of differential calculus, as well as some introductory work on complex numbers. It is the first of two subjects developing aspects of calculus.

School Computer, Data & Math Sciences

Discipline Mathematics

Student Contribution Band HECS Band 1 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 1 subject

Equivalent Subjects LGYA 4423 Concepts of Mathematics

Incompatible Subjects LGYA 4295 Mathematics for Business
MATH 1016 Mathematics for Engineers 1

Restrictions

Students may complete the three subjects Quantitative Thinking, Analysis of Change and Maths 1A in the following order. MATH 1026 Quantitative Thinking, MATH 1001 Analysis of Change, MATH 1014 Mathematics 1A. This means that students may complete MATH 1026 before attempting MATH 1001, but not after. MATH 1001 and MATH 1026 may be attempted before MATH 1014, but not after. Students may not enrol in MATH 1026 and MATH 1001 or MATH 1026 and MATH 1014 or MATH 1001 and MATH 1014 in the same teaching session. Students enrolled in the Bachelor of Engineering (Honours), Bachelor of Engineering or Bachelor of Engineering Science may not enrol in any of the subjects MATH 1001, MATH 1026 or MATH 1014.

Assumed Knowledge

Mathematics achieved at Bands 5-6, or knowledge equivalent to 300830 Analysis of Change.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Define i and operate with complex numbers.
2. Define and manipulate the following functions: exponential, trigonometric, hyperbolic, logarithmic, inverse trig and inverse hyperbolic.
3. Find limits of functions and determine if a function is continuous or differentiable.
4. Find the derivatives of functions.
5. Apply correctly techniques of differential calculus to problems involving optimization, curve sketching and rates of change.
6. Calculate basic integrals.

Subject Content

- Functions and Inverse Functions: Functions and their Graphs; Trigonometric, Exponential, and Hyperbolic Functions; Inverse Functions; Logarithmic Functions; Inverse Trigonometric and Hyperbolic Functions.
- Complex Numbers: Definition; Basic Operations; Argand Diagram; Polar Form; Euler's Formula; De Moivre's Theorem; Powers and Roots.
- Limits and Continuity: Limit of a Function; Limit Laws; One-Sided Limits; Limits at Infinity; The Sandwich Theorem; Vertical and Horizontal Asymptotes; Intermediate Value Theorem.
- Differentiation: Definition of the Derivative; Differentiability implies Continuity; Derivatives of Polynomials and Exponential Functions; Product and Quotient Rules; Chain Rule; Implicit Differentiation; Derivatives of Trigonometric and Hyperbolic Functions.
- Applications of Derivatives: Maximum and Minimum Values; Extreme Value Theorem; Rolle's Theorem and the Mean Value Theorem; Monotonic Functions and the First Derivative Test; Concavity and Curve Sketching; Applied Optimization; Indeterminate Forms ∞/∞
- Integration: Antiderivatives; Indefinite and Definite Integrals; Connection between the Definite and Indefinite Integrals.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Short Answer	45 minutes	10	N	Individual
Short Answer	45 minutes	10	N	Individual
Short Answer	45 minutes	15	N	Individual
Short Answer	45 minutes	15	N	Individual
Final Exam	3 hours	50	Y	Individual

Spring Online

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Numerical Problem Solving	5 hours	10	N	Individual
Numerical Problem Solving	5 hours	10	N	Individual
Numerical Problem Solving	5 hours	15	N	Individual
Numerical Problem Solving	5 hours	15	N	Individual
Numerical Problem Solving	3 hours	50	Y	Individual

Prescribed Texts

- Stewart, J. (2016). Calculus: Early transcendentals (8th ed.). Boston, MA: Cengage Learning.

Teaching Periods

Autumn (2022)

Campbelltown

Day

Subject Contact Alexander Lee ([https://directory.westernsydney.edu.au/search/name/Alexander Lee/](https://directory.westernsydney.edu.au/search/name/Alexander%20Lee/))

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1014_22-AUT_CA_D#subjects)

Penrith (Kingswood)

Day

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Parramatta - Victoria Rd

Day

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Spring (2022)

Campbelltown

Day

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Online

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