MATH 1014 MATHEMATICS 1A

Credit Points 10

Legacy Code 300672

Coordinator Charles Zworestine (https://directory.westernsydney.edu.au/search/name/Charles Zworestine/)

Description This Level 1 unit 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 units 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: 300831 Quantitative Thinking, 300830 Analysis of Change, 300672 Mathematics 1A. This means that students may complete 300831 before attempting 300830, but not after. 300830 and 300831 may be attempted before 300672, but not after. Students may not enrol in 300831 and 300830 or 300831 and 300672 or 300830 and 300672 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 300830, 300831 or 300672.

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 Func
- Applications of Derivatives: Maximum and Minimum Values; Extreme Value Theorem; Roll's Theorem and the Mean Value Theorem; Monotonic Functions and the First Derivative Test; Concavity and Curve Sketching; Applied Optimization; Indeterminate Forms an' L'
- 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.

Item	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

Prescribed Texts

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

Teaching Periods

Autumn

Campbelltown

Day

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

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

Penrith (Kingswood)

Day

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

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

Parramatta - Victoria Rd

Day

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

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

Spring

Campbelltown

Day

Subject Contact Charles Zworestine (https://directory.westernsydney.edu.au/search/name/Charles Zworestine/)

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

Online

Online

Subject Contact Charles Zworestine (https://directory.westernsydney.edu.au/search/name/Charles Zworestine/)

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

Parramatta - Victoria Rd

Day

Subject Contact Charles Zworestine (https://directory.westernsydney.edu.au/search/name/Charles Zworestine/)

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