

MATH 1015 MATHEMATICS 1B

Credit Points 10

Legacy Code 300673

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

Description This Level 1 subject provides a solid foundation in the theory and applications of integral calculus, as well as some introductory work on linear algebra and infinite sequences and series. It is the second of two subjects developing aspects of calculus.

School Computer, Data & Math Sciences

Discipline Mathematics

Student Contribution Band HECS Band 1 10cp

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

Level Undergraduate Level 1 subject

Pre-requisite(s) MATH 1014

Equivalent Subjects LGYA 4423 - Concepts of Mathematics

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

Restrictions

This subject is not available to students enrolled in the Bachelor of Engineering (Honours), Bachelor of Engineering or Bachelor of Engineering Science.

Learning Outcomes

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

1. Do calculations with matrices and determinants and use row reduction to solve systems of equations.
2. State the definition of the definite integral and apply the Fundamental Theorem of Calculus.
3. Use the various techniques of integration to evaluate a range of integrals.
4. Apply correctly techniques of integral calculus to problems involving some of the following: areas, volumes, work, blood flow, cardiac output, consumer surplus, hydrostatic force.
5. Use the various tests to determine if a series converges and find Taylor and Maclaurin series for functions.
6. Find the dot and cross product of vectors and the equations of lines and planes.

Subject Content

- Matrices and Determinants: Operations on matrices; Systems of Linear Equations; Row Reduction (Gaussian and Gauss-Jordan Elimination); Properties of Determinants; Cramer's Rule; Inverse of a Matrix (by Row Reduction and the Adjoint Method).
- Vectors: Dot product and cross product; equations of lines and planes.
- Integration: Riemann Sums; Definition of the Definite Integral; Fundamental Theorem of Calculus; Indefinite Integrals; Integration by Substitution; The Logarithm Defined as an Integral.

- Techniques of Integration: Integration by Parts; Trigonometric Integrals; Trigonometric Substitutions; Method of Partial Fractions; Improper Integrals.
- Applications of Integration: Areas and Volumes; Average Value of a Function; Separable Differential Equations; Exponential Growth and Decay; and Topics from: Volumes using cylindrical shells, Work, Arc Length, Area of a Surface of Revolution, Hydrostat
- Infinite Sequences and Series: Definitions; Integral Test and Estimates of Sums; Comparison Tests; Alternating Series; Absolute Convergence; Ratio and Root Tests; Power Series; Taylor and Maclaurin Series; Applications of Taylor Polynomials.

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	Mandatory
Quiz	45 minutes	10	N	Individual	Y
Quiz	45 minutes	10	N	Individual	Y
Quiz	45 minutes	15	N	Individual	Y
Quiz	45 minutes	15	N	Individual	Y
Final Exam	3 hours	50	Y	Individual	Y

External 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	Mandatory
Numerical Problem Solving	3 Hours	10	N	Individual	N
Numerical Problem Solving	3 Hours	10	N	Individual	N
Numerical Problem Solving	3 Hours	10	N	Individual	N
Applied Project	2500 - 3000 words	20	N	Individual	N
Final Exam	3 Hours	50	Y	Individual	Y

Prescribed Texts

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

Teaching Periods

Spring (2025)

Campbelltown

Hybrid

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1015_25-SPR_CA_3#subjects)

Penrith (Kingswood)

Hybrid

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1015_25-SPR_KW_3#subjects)

Parramatta - Victoria Rd

Hybrid

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

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1015_25-SPR_PS_3#subjects)