

# MATH 1015 MATHEMATICS 1B

**Credit Points** 10

**Legacy Code** 300673

**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 unit 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 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/](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.

Item	Length	Percent	Threshold	Individual/ Group Task
Quiz	45 minutes	10	N	Individual
Quiz	45 minutes	10	N	Individual
Quiz	45 minutes	15	N	Individual
Quiz	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, 2016.

Teaching Periods

## Spring 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=MATH1015\\_22-SPR\\_CA\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1015_22-SPR_CA_D#subjects))

## Penrith (Kingswood)

**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=MATH1015\\_22-SPR\\_KW\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1015_22-SPR_KW_D#subjects))

## Parramatta - Victoria Rd

**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=MATH1015\\_22-SPR\\_PS\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1015_22-SPR_PS_D#subjects))