# MATH 1019 MATHEMATICS FOR ENGINEERS 2

**Credit Points** 10

**Legacy Code** 200238

**Coordinator** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

**Description** This subject is the second of two mathematics subjects to be completed by students enrolled in an Engineering degree during their first year of study. The content covers a number of topics that build on the calculus knowledge from Mathematics for Engineers 1. The subject matter includes: ordinary differential equations, Laplace transforms and multi-variable 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 1016

**Equivalent Subjects** -

**Incompatible Subjects** MATH1035

## Learning Outcomes

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

1. Recognise and solve various types of first and second order differential equations and some higher order ordinary differential equations
2. Set up a linear 2D system of differential equations and investigate its solution and the nature of its critical points
3. Apply Laplace transforms in solving problems
4. Use multivariable calculus techniques competently
5. Evaluate multiple (double and triple) integrals.

## Subject Content

First Order Ordinary Differential Equations - Separable and linear equations and applications.
Second Order Linear ODEs- both homogeneous and non homogeneous with constant coefficients and applications, Euler Cauchy and Power series solutions.
Higher Order ODEs - homogeneous and non homogeneous with constant coefficients and Euler-Cauchy.
2D linear constant coefficient homogeneous systems, phase plane, critical points and criteria for critical points.
Laplace Transforms and solving ODEs using Laplace transforms.
Level curves and sketching regions in space
Limits and continuity of functions of two variables
Partial differentiation
Chain rule
Gradient vectors and directional derivatives
Equations of normal lines and tangent planes
Maxima, minima and saddle points
Lagrange multipliers
Double integrals in rectangular and polar coordinates and applications
Triple integrals in rectangular, cylindrical and spherical coordinates and applications.
1. First Order Ordinary Differential Equations - Separable and linear equations and applications.
2. Second Order Linear ODEs- both homogeneous and non homogeneous with constant coefficients and applications, Euler Cauchy and Power series solutions.
3. Higher Order ODEs - homogeneous and non homogeneous with constant coefficients and Euler-Cauchy.
4. 2D linear constant coefficient homogeneous systems, phase plane, critical points and criteria for critical points.
5. Laplace Transforms and solving ODEs using Laplace transforms.
6. Level curves and sketching regions in space
7. Limits and continuity of functions of two variables
8. Partial differentiation
9. Chain rule
10. Gradient vectors and directional derivatives
11. Equations of normal lines and tangent planes
12. Maxima, minima and saddle points
13. Lagrange multipliers
14. Double integrals in rectangular and polar coordinates and applications
15. Triple integrals in rectangular, cylindrical and spherical coordinates and applications
15. Triple integrals in rectangular, cylindrical and spherical coordinates and applications.

## 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 | 30 minutes per quiz | 10 | N | Individual | N |
| Intra-session Exam | 60 minutes | 20 | N | Individual | Y |
| Intra-session Exam | 60 minutes | 20 | N | Individual | Y |
| Final Exam | 120 minutes | 50 | Y | Individual | Y |

### Summer On-site

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 | 60 minutes | 20 | N | Individual | Y |
| Numerical Problem Solving | 60 minutes | 20 | N | Individual | Y |
| Final Exam | 120 minutes | 50 | Y | Individual | Y |
| Quiz | 30 minutes (per quiz) | 10 | N | Individual | N |

Teaching Periods

# Autumn (2025)

## Penrith (Kingswood)

### Hybrid

**Subject Contact** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-AUT_KW_3#subjects)

## Parramatta - Victoria Rd

### Hybrid

**Subject Contact** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-AUT_PS_3#subjects)

# Sydney City Campus - Term 1 (2025)

## Sydney City

### On-site

**Subject Contact** Peter Lendrum (https://directory.westernsydney.edu.au/search/name/Peter Lendrum/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SC1_SC_1#subjects)

# Sydney City Campus - Term 2 (2025)

## Sydney City

### On-site

**Subject Contact** Peter Lendrum (https://directory.westernsydney.edu.au/search/name/Peter Lendrum/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SC2_SC_1#subjects)

# Spring (2025)

## Penrith (Kingswood)

### Hybrid

**Subject Contact** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SPR_KW_3#subjects)

## Parramatta - Victoria Rd

### Hybrid

**Subject Contact** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SPR_PS_3#subjects)

# Sydney City Campus - Term 3 (2025)

## Sydney City

### On-site

**Subject Contact** Peter Lendrum (https://directory.westernsydney.edu.au/search/name/Peter Lendrum/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SC3_SC_1#subjects)

# Summer (2025)

## Penrith (Kingswood)

### On-site

**Subject Contact** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SUM_KW_1#subjects)

## Parramatta City - Macquarie St

### On-site

**Subject Contact** Wei Xing Zheng (https://directory.westernsydney.edu.au/search/name/Wei Xing Zheng/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MATH1019_25-SUM_PC_1#subjects)