MATH 1019 MATHEMATICS FOR ENGINEERS 2

Credit Points 10

Legacy Code 200238

Coordinator Peter Lendrum (https://directory.westernsydney.edu.au/search/name/Peter Lendrum/)

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 HECS Band contribution amount 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 LGYB 0454 Mathematics for Engineers 2 (WSTC) MATH 1020 Mathematics for Engineers 2 (WSTC Assoc Deg)

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

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
Numerical Problem Solving Test 1	60 minutes	20	N	Individual
Numerical Problem Solving Test 2	60 minutes	20	N	Individual
Final Exam	120 minutes	50	Y	Individual
Quizzes	30 minutes (per quiz)	10	N	Individual

Teaching Periods

Summer A (2022)

Penrith (Kingswood)

Day

Subject Contact Li Zhou (https://directory.westernsydney.edu.au/search/name/Li Zhou/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SUA_KW_D#subjects)

Autumn (2022)

Penrith (Kingswood)

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-AUT_KW_D#subjects)

Parramatta - Victoria Rd

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-AUT_PS_D#subjects)

Sydney City Campus - Term 1 (2022)

Sydney City

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SC1_SC_D#subjects)

Sydney City Campus - Term 2 (2022)

Sydney City

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SC2_SC_D#subjects)

Spring (2022)

Penrith (Kingswood)

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SPR_KW_D#subjects)

Parramatta - Victoria Rd

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SPR_PS_D#subjects)

Sydney City Campus - Term 3 (2022)

Sydney City

Day

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SC3_SC_D#subjects)

Summer (2022)

Penrith (Kingswood)

On-site

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

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1019_22-SUM_KW_1#subjects)

Autumn (2023)

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_23-AUT_KW_1#subjects)

Parramatta - Victoria Rd

On-site

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Sydney City Campus - Term 1 (2023)

Sydney City

On-site

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Sydney City Campus - Term 2 (2023)

Sydney City

On-site

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Spring (2023)

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On-site

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Sydney City Campus - Term 3 (2023)

Sydney City

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