MATH 1021 MATHEMATICS FOR ENGINEERS PRELIMINARY

Credit Points 10

Legacy Code 300743

Coordinator Donald Shearman (https://directory.westernsydney.edu.au/search/name/Donald Shearman/)

Description This unit is specifically designed for students enrolling in the Bachelor of Engineering (Honours) and Bachelor of Engineering Science degree courses, who do not have a mathematical background in differential and integral calculus. The content of the unit consists of topics in arithmetic and algebra, trigonometry and trigonometric functions, logarithmic and exponential functions, differential and integral 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 MATH 1023 - Mathematics for Engineers Preliminary (WSTC) MATH 1022 - Mathematics for Engineers Preliminary (WSTC Assoc Deg)

Incompatible Subjects LGYA 4425 - Mathematical Methods A MATH 1011 - Fundamentals of Mathematics MATH 1016 - Mathematics for Engineers 1 MATH 1018 - Mathematics for Engineers 1 (WSTC)

Restrictions All students entering the Bachelor of Engineering (Honours) and Bachelor of Engineering Science will be enrolled in this subject. Students from the Bachelor of Engineering (Honours) program who have sufficient background knowledge in mathematics may attempt a readiness test to allow them to move directly to Mathematics for Engineers 1 if they pass this test.

Learning Outcomes

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

1. Perform arithmetic operations and manipulate algebraic symbols as required in solving mathematical problems set in an engineering context
2. Solve mathematical problems using trigonometry, logarithmic and exponential functions
3. Apply correctly the techniques of both differential and integral calculus to solve problems that may involve transcendental functions.
4. Communicate mathematical ideas using standard practices

Subject Content

1. Arithmetic and Algebra: Rational and irrational numbers, indices, manipulation of algebraic expressions, factorisation, linear equations and quadratic expressions, simultaneous equations.
2. Relations and Functions: Domain and range, linear functions, quadratic functions, roots of quadratic equations
3. Logarithmic and Exponential Functions: Definition and properties of exponentials, graphing exponentials, differentiation and integration of exponentials, exponential growth and decay. Definition and properties of logarithms, graphing logarithms, differentiation and integration of logarithms.
4. Trigonometry: Trigonometric ratios, exact ratios, Sine and Cosine rules, reciprocal ratios, angles of any magnitude
5. Trigonometric Functions: Radian measure, graphing, properties of functions, differentiation, integration
6. Further Trigonometric Functions: Applied trigonometry, sums and differences of angles, equation solving, general solutions to trigonometric equations.
7. Inverse Functions and Inverse Trigonometric Functions: y'logax and y'ax as inverse functions, inverse trigonometric functions, differentiation and integration of inverse functions.
8. Differentiation: Limits and continuity - the derivative from first principles; differentiation formulae; implicit differentiation, tangents and normals to curves, stationary points, higher order derivatives, curve sketching, problems involving maxima and minima, differentiation of trigonometric functions, logarithmic and exponential functions, and inverse trigonometric functions
9. Integration: Primitive functions, definite integrals, areas between curves; integration of trigonometric functions, logarithmic and exponential functions, and inverse trigonometric functions.
8. Differentiation: Limits and continuity; the derivative from first principles; differentiation formulae; implicit differentiation, tangents and normals to curves, stationary points, higher order derivatives, curve sketching, problems involving maxima and minima, differentiation of trigonometric functions, logarithmic and exponential functions, and inverse trigonometric functions
9. Integration: Primitive functions, definite integrals, areas between curves; integration of trigonometric functions, logarithmic and exponential functions, and inverse trigonometric functions

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	Twelve online quizzes will be available, with the 10 best scores taken.	10	N	Individual
Numerical Problem Solving	50 minutes in duration	10	N	Individual
Numerical Problem Solving	50 minutes in duration	10	N	Individual
Numerical Problem Solving	50 minutes in duration.	20	N	Individual
Final Exam	2 hours in duration	50	Y	Individual

Prescribed Texts

- Rattan, Kuldip S., & Klingbeil, Nathan W. (2014). Introductory mathematics for engineering applications. Hoboken, NJ John Wiley and Sons, Inc.

Teaching Periods

Autumn
Penrith (Kingswood)
Day
Subject Contact Donald Shearman (https://directory.westernsydney.edu.au/search/name/Donald Shearman/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1021_22-AUT_KW_D#subjects)

Parramatta - Victoria Rd
Day
Subject Contact Donald Shearman (https://directory.westernsydney.edu.au/search/name/Donald Shearman/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1021_22-AUT_PS_D#subjects)

Sydney City Campus - Term 1
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=MATH1021_22-SC1_SC_D#subjects)

Sydney City Campus - Term 2
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=MATH1021_22-SC2_SC_D#subjects)

Spring
Penrith (Kingswood)
Day
Subject Contact Donald Shearman (https://directory.westernsydney.edu.au/search/name/Donald Shearman/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1021_22-SPR_KW_D#subjects)

Parramatta - Victoria Rd
Day
Subject Contact Donald Shearman (https://directory.westernsydney.edu.au/search/name/Donald Shearman/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1021_22-SPR_PS_D#subjects)

Sydney City Campus - Term 3
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=MATH1021_22-SC3_SC_D#subjects)