

# MATH 1022 MATHEMATICS FOR ENGINEERS PRELIMINARY (WSTC ASSOC D)

**Credit Points** 10

**Legacy Code** 700103

**Coordinator** Zdenka Misanovic ([https://directory.westernsydney.edu.au/search/name/Zdenka Misanovic/](https://directory.westernsydney.edu.au/search/name/Zdenka%20Misanovic/))

**Description** This unit covers the fundamental mathematical concepts and techniques necessary for the study of Engineering. Topics include Arithmetic and Algebra, Trigonometry, Functions, and Introductory Differential and Integral calculus.

**School** Eng, Design & Built Env

**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

**Equivalent Subjects** MATH 1021 - Mathematics for Engineers Preliminary  
MATH 1023 - Mathematics for Engineers Preliminary (WSTC)

**Incompatible Subjects** MATH 1011 - Fundamentals of Mathematics

**Restrictions** Students must be enrolled at Western Sydney University, The College in 7022 Associate Degree in Engineering.

## 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:  $y=\log_a x$  and  $y=ax$  as inverse functions, inverse trigonometric functions, differentiation and integration of inverse functions.
8. Differentiation: Limits and continuity;
9. 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
10. 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
5 Online quizzes. Each minutes quiz is worth 3%	Approx. 30	15	N	Individual
Class Test	90 minutes	25	N	Individual
4 Online quizzes. Each minutes quiz is worth 5%	Approx. 30	20	N	Individual
Final examination	2 hours	40	Y	Individual

Prescribed Texts

- Croft, A & Davison, R (2008) Mathematics for engineers (3rd ed). Harlow: Pearson Prentice Hall, Harlow UK

Teaching Periods

## Quarter 3

### Nirimba Education Precinct

#### Composite

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View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=MATH1022\\_22-Q3\\_BL\\_C#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MATH1022_22-Q3_BL_C#subjects))