Mathematics

Cambridge International Education (CIE):

- IGCSE Extended/Core Mathematics: 0580
- IGCSE Additional Mathematics: 0606

Description

The IGCSE Mathematics Curriculum at Dulwich College (Singapore) aims to equip students with mathematical fluency, reasoning & problem-solving skills. During the course, students will develop academic rigour and different ways of thinking, alongside their understanding of how mathematics is used and applied in the world outside of the classroom. Students will also develop skills that are not specific to mathematics such as resilience, independence, logic & the ability to ask questions.

The course aims to serve all students with a range of ambitions, from securing a foundational understanding of the subject to delving into the more complex and abstract side to the subject. We are fortunate to offer a variety of pathways to fit every individual depending on their goals & suitability.

Pathways

All students study the IGCSE 0580 Mathematics content. Given the progressive nature of much of the subject, students must learn easier content first and then progress onto more complex material. CIE describe that 'the course is tiered to enable effective differentiation for learners. The Core content is intended for learners targeting grades G–C, and the Extended content is intended for learners targeting grades D–A*. *All of the Core content is in the Extended content*'. Furthermore, the advice is that 'candidates aiming for grades A* to C should follow the Extended curriculum'.

To deliver a differentiated curriculum, we have three bands.

Band 1 offers accelerated content that is delivered at a challenging pace where academic rigour is a priority. As such, we begin to teach most content from Additional Mathematics later in Year 10.

Band 2 aims to provide for students for whom the Extended IGCSE is an appropriate challenge.

Band 3 has the same aims as Band 2, other than we aim to provide a more supportive environment with smaller class sizes so that we can scaffold the subject appropriately and ensure all our students are confident in their learning. If necessary, sitting a Core IGCSE is an option.

Below is a table outlining the course content studied in each band.

	Band 1	Band 2	Band 3
Year 9	Accelerated Extended curriculum	Extended curriculum	Extended curriculum
Year 10	Accelerated Extended curriculum with components of Additional Mathematics	Extended curriculum	Extended curriculum
Year 11	Additional Mathematics curriculum with components of Extended Mathematics	Extended curriculum	Extended curriculum

When deciding which band is most appropriate for students, we need to assess their current mathematical skillset, knowledge, determination, and pace of learning. This takes time to get right and professional judgement. Part of our decision-making process involves one of the pillars at DCSG that 'students come first'. For us, students' belief in their ability to learn is extremely important for lifelong learning. Students also develop at different rates throughout childhood. Therefore, a balance must be found between challenge & support, and we seek to be flexible as students' needs change and acknowledge that moves may be necessary and in students' best interests.

Assessment Breakdown

At the end of Year 11, we aim for all our students to sit the Extended Mathematics IGCSE (target grades D-A*).

	Band 1	Band 2	Band 3
Examinations	Extended & Additional (an extra GSCE)	Extended	Extended as the default. Options to sit Core if a Grade C in Extended is uncertain. This may be sat either in November or May in Year 11.

Examination details below.

0580 Extended & Core:

Core assessment

Core candidates take Paper 1 and Paper 3. The questions are based on the Core curriculum.

Paper 1 (Core)		Paper 3 (Core)	
1 hour	35%	2 hours	65%
56 marks		104 marks	
Short-answer questions		Structured questions	
Externally assessed		Externally assessed	

Extended assessment

Extended candidates take Paper 2 and Paper 4. The questions are based on the Extended curriculum.

Paper 2 (Extended)		Paper 4 (Extended)	
1 hour 30 minutes	35%	2 hours 30 minutes	65%
70 marks		130 marks	
Short-answer questions		Structured questions	
Externally assessed		Externally assessed	

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0606 Additional Mathematics:

Candidates are eligible for grades A* to E. Grades F and G will not be available. Candidates who do not achieve the minimum mark for grade E will be unclassified.

All candidates take:	
Paper 1	2 hours 50%
80 marks	
Candidates answer all questions	
Scientific calculators are required	
Externally assessed	

and:	
Paper 2	2 hours 50%
80 marks	
Candidates answer all questions	
Scientific calculators are required	
Externally assessed	

Course Outline: Band 1

Year	Michaelmas Term	Lent Term	Trinity Term
9	Pythagoras & trigonometry in right & non-right triangles in 2D & 3D Trigonometric graphs Bearings Bounds Linear & quadratic expressions & equations Completing the square Algebraic fractions	Shape & angle Circle theorems Geometric proof Types of number, indices, standard form, exponential equations Surds Logarithms	Analysing & representing univariate & bivariate data Perimeter & area Surface area & volume Similarity in 3D Transformations of shape
10	Set theory Probability Percentages Sequences & series Graphs Coordinate geometry	Ratio & proportion Compound measures Real life graphs Simultaneous equations & graphs	Functions Transformations of functions Further quadratics Exponential functions & logarithms Polynomials & linearisation
11	The unit circle & radian measure Counting (permutations & combinations) and the binomial theorem Vectors Differential calculus	Integral calculus Applications of calculus	IGCSE examinations

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Course Outline: Band 2 & 3

Year	Michaelmas Term	Lent Term	Trinity Term
9	Pythagoras & trigonometry in right-angled triangles 2D & 3D Similarity in 2D Number review Approximation & bounds Manipulating algebraic expressions Solving equations Rearranging formulae Inequalities	Shape & angle Geometric proof (for congruence & similarity) Types of number Indices Standard form Exponential equations	Analysing & representing univariate & bivariate data Perimeter & area Transformations of shape
10	Set Theory Probability Percentages Sequences Graphs Coordinate geometry	Ratio & proportion Compound measures Real life graphs Surface area & volume Similarity in 3D	Quadratic equations Completing the square Algebraic fractions
11	Circle theorems Further trigonometry & bearings Functions Simultaneous equations & graphs	Vectors Differentiation	IGCSE examinations

Additional Information

Future courses & the IB

Four courses are offered here at Dulwich for the IBDP:

- Standard Level
    - Applications & Interpretations (AI)
    - Analysis & Approaches (AA)
- Higher Level
    - Applications & Interpretations (AI)
    - Analysis & Approaches (AA)

Can students study Higher Level (HL) Maths without having studied Additional Mathematics?

We feel that students should have a wide range of options available to them. As such, students that do not sit Additional Mathematics in Year 11 are not prohibited from studying maths at HL. We do, however require that students without this background do exhibit a strong commitment to the subject and require attendance for two semesters at our *Head Start to IB* CCA in Year 10-11 from April to December. This course covers the fundamentals of a few topics that will be pre-requisite knowledge for studying at HL. Without attendance at the CCA, it is likely the pace and level of HL would be too much.

Can students study Maths for the IBDP if they sat the Core exam and not Extended?

Our recommended minimum level of entry to study Maths at Standard Level is a Grade B or 6. We need to be honest about the pace and difficulty of the course, and our experience is that students with a Grade B or higher are more likely to experience success on the course.