



International Baccalaureate
Baccalauréat International
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Supporting Student Choice in DP Mathematics

A Guide for University and Career Counsellors

In 2019, the IB launched two mathematics subjects: **Mathematics: applications and interpretation (MAI)** and **Mathematics: analysis and approaches (MAA)**. Each subject is offered at both standard level (SL) and higher level (HL), which gives students the option of four math courses: MAI SL, MAI HL, MAA SL, MAA HL. They are designed to meet the diverse needs, interests and motivations of all Diploma Programme (DP) and Career-related Programme (CP) students.

In your role as a University and Career Counsellor (UCC), you guide students to the mathematics course that is the best fit for them, given their academic capabilities and future aspirations coupled with university entry requirements. The IB believes that both SL courses prepare students to transition to most arts, social science, life science and medicine university degree programs. The additional engagement in both HL courses prepares students to transition to any university degree program, particularly those requiring substantial mathematics knowledge and skills such as engineering and management sciences.

IB DP mathematics: Overview and design

Overview

IB mathematics subjects focus on developing the skills of:

- analysis
- abstraction and generalisation
- risk awareness and statistical literacy
- algorithmic thinking
- modelling
- inquiry.

In true IB fashion, the course guides are designed to encourage teachers and students to appreciate the international dimensions of mathematics and the multiplicity of its cultural and historical perspectives by integrating theory of knowledge, international-mindedness and other IB values into their mathematical studies.

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"... the prior knowledge I gained from all the statistics definitely set a good groundwork for the statistics I have to do at university ... the internal assessment (that I did on probability and statistics), helped me even more, as it allowed me to get acquainted with excel."

– **Anna Bischoff**, MAI graduate studying psychology at University of Amsterdam
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Design

Figure 1 shows the number of teaching hours for each of the four courses (MAA SL, HL and MAI SL, HL).

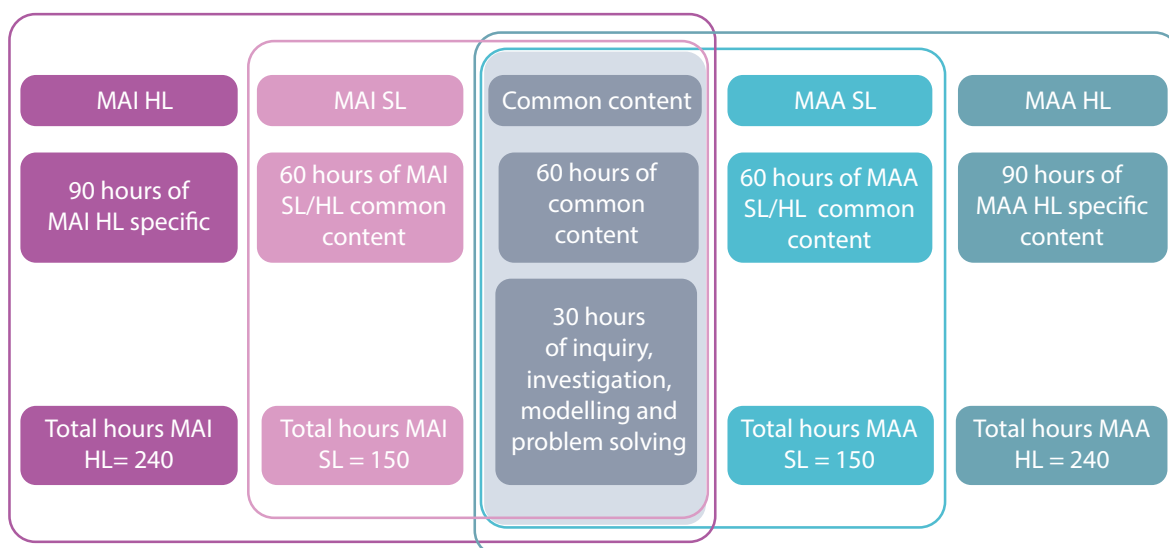


Figure 1: Teaching hours for the four mathematics courses

The 30 hours of inquiry, investigation, modelling and problem solving are an integral part of each course; its assessment is compulsory for both SL and HL students. It enables students to apply their skills and knowledge and pursue their personal interests without the time limitations and other constraints that are associated with written examinations. The additional 90 hours of content in the HL courses is meant to deepen student understanding and expose them to more complex concepts.

All four courses cover the same five topics within mathematics, but with varying emphasis in each area:

- number and algebra
- functions
- geometry and trigonometry
- statistics and probability
- calculus.

MAI emphasizes the meaning of mathematics in context by focusing on topics that are often used as applications or in mathematical modelling. Students are encouraged to solve real-world problems, communicate them mathematically and interpret the conclusions or generalizations. MAA emphasizes the ability to construct, communicate and justify correct mathematical arguments; develop insight into mathematical form and structure; and appreciate the links between concepts in different topic areas.

Not all students need a pure mathematics subject such as MAA. For example, a student who wishes to pursue a journalism career will benefit from the increased focus on statistics



and storytelling that is taught in the MAI curriculum. For more information, read the subject briefs:

- [Mathematics: Application and interpretation](#)
- [Mathematics: Analysis and approaches](#)

Figure 2 provides an intuitive view of the content in the four courses. To view the full graphics, use these [individual mind maps](#).

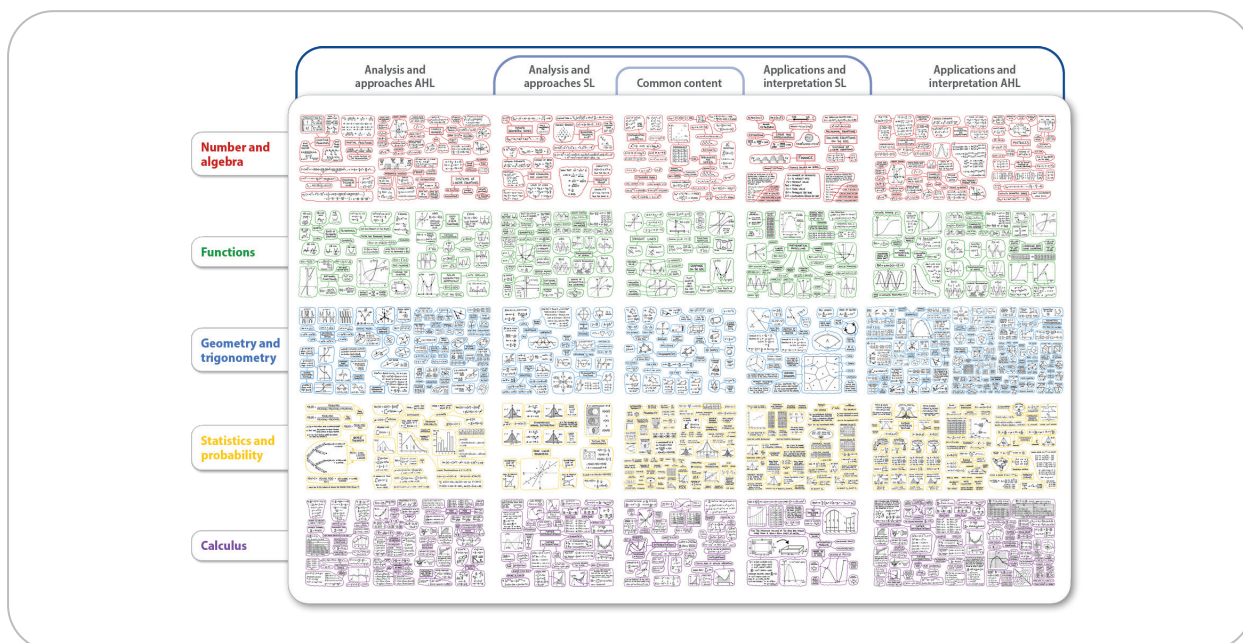


Figure 2: Mathematics mind map

Course rigor

The baseline of both subjects is rigor. Building on that baseline, the IB has designed each subject with the different aspirations of our student community in mind. Candidate results data from May 2021 and May 2022 **shows that, statistically, there is no difference between student performance in the two mathematics courses at higher level and the two maths courses at standard level. Students who achieve high grades in their other five DP subjects are likely to achieve similar grades in whichever mathematics course they choose to take.** When universities have questions about course rigor, you can share [this document](#), which contains the statistical analysis and other evidence.

Mechanics in the IB DP curriculum

Sometimes universities question the lack of mechanics in the DP mathematics curriculum. Unlike some other curricula in which the mechanics is taught within the mathematics course, in the DP, students engage with most of the material in the DP physics course. If a student does either mathematics subject at HL along with the IB physics course, they will meet the necessary mechanics university entry requirements. Please refer universities to the [DP physics subject brief](#) when these questions arise.

Current university recognition landscape

The IB communicates regularly with universities to encourage them to strengthen their DP mathematics recognition policies and ensure they are fair and fit for purpose. You may wish to consider the following suggestions:

- students interested in engineering, physical sciences and economics take either of the higher level (HL) DP mathematics courses
 - students interested specifically in pure mathematics take the Mathematics: analysis and approaches subject
 - students interested in social sciences, natural sciences, business, psychology and design take either mathematics subject and check with the university
 - students interested in the performing arts, creative arts, and humanities take the Mathematics: application and interpretation subject.
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- “All Oxford courses that state that they require Mathematics will accept both courses at HL, apart from Chemistry, which will require applicants to have taken either of the courses at Higher Level, or the Analysis and Approaches course at SL, depending on what other subjects they are taking.”*
- **Oxford University Admissions**
-

Students who are unsure about what they want to study at university should consider the right balance between the mathematics course that offers the most challenge and their ability to score well in the course. For example, a student with strong performance in either of the HL DP mathematics courses and who wants to study a subject that does not traditionally include mathematics, such as music or linguistics, will demonstrate transferable skills and present a transcript that demonstrates a range of capabilities.

Universities worldwide recognize mathematics in different ways. It is essential that, as a UCC, you understand the differences from country to country and university to university. If there are minimum requirements for entry in a specific country or university, please consider whether a particular DP mathematics course:

- is recommended or preferred
- will give your students a more competitive advantage
- will help your students transition successfully to their chosen university program.

At highly selective universities, admissions departments often look for students to take mathematics courses that support their intended field(s) of study. Table 1 on page 7 reflects the general recognition policy for IB mathematics courses in top IB student-destination countries. There will always be countries you are more or less familiar with and Table 1 can serve as a starting point.

Best practices and tips

Before DP/CP year one:

- Use Table 1 when first discussing options with your students. It will give students a general idea of how their aptitude in mathematics and their study interests align with general university entry requirements in top destination countries.
- As you talk to students about their career paths and destination goals, share some of the details above to convey the unique attributes of each DP mathematics subject.
- You may want to engage with Head of Mathematics in 10th grade to gather input from mathematics teachers about route and appropriateness for students.



During DP/CP year 1

- Identify and support students who may be struggling by either suggesting extra tutoring or revisiting the student's course selection and seeing if any changes can be made.
- Determine student destination options based on mathematics performance.
- When students become serious about their country of study and their preferred university, always check the individual university websites for the most accurate information.

Beginning of DP/CP year 2

- If students change their mind on destination country halfway through their DP and now need to meet different mathematics course entry requirements, encourage students and parents to be open to other university options.

The information in Table 1 is based on general admissions criteria and is not intended as a definitive or exhaustive source. You are strongly advised to check the specific admissions guidance for the universities that students are interested in applying to and other sources of information, for example the [UCAS website](#).

For some countries listed in the table, there may be additional or alternative requirements for entry. Please read our [country and university recognition statements](#).

Table 1: General DP mathematics admissions criteria

University program	Mathematics, Engineering and Physical sciences	Life sciences, medicine and psychology	Economics and business	Arts and humanities
Australia	Most universities accept MAA SL, MAA HL or MAI HL , some universities may consider MAI SL .	Most universities accept MAA SL, MAA HL or MAI HL , some universities may consider MAI SL .	Most universities accept MAA SL, MAA HL or MAI HL , some universities may consider MAI SL .	Mathematics is not a specific requirement for these courses at most universities.
Canada	Both math courses are accepted at HL , but MAA HL may be preferred.	Most universities accept MAA SL and both math courses at HL , but MAA HL may be preferred.	Most universities accept MAA SL and both math courses at HL , but MAA HL may be preferred.	All four mathematics courses are permitted, but MAA HL or MAI HL may be preferred.
France	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses.
Germany	Most universities accept both math courses at HL , but MAA HL may be preferred.	Most universities require MAA SL or MAI SL , but MAA HL may be preferred.	Both math courses are accepted at HL , but MAA HL may be preferred.	Most universities require MAA SL or MAI SL .
Hong Kong	Most universities accept both mathematics courses at HL , but some may consider MAA SL .	Most universities will accept any of the four mathematics courses, but MAA HL or MAI HL may be preferred for certain programs.	Most universities will accept any of the four mathematics courses, but MAA HL or MAI HL may be preferred for certain programs.	Mathematics is not a specific requirement for these courses at most universities.
India	Most universities require MAA HL or MAI HL .	Mathematics is not a specific requirement for these courses at most universities.	Most universities will accept any of the four math courses.	Most universities will accept any of the four math courses.
Japan	Most universities require MAA HL or MAI HL .	Most universities require MAA HL or MAI HL .	Most universities will accept all four mathematics courses, but MAA HL or MAI HL may be preferred.	Most universities will accept all four mathematics courses, but MAA HL or MAI HL may be preferred.
Netherlands	Most universities require MAA HL .	Life Sciences and Medicine – most universities require MAA SL, MAA HL or MAI HL . Psychology – most universities require MAA SL, MAA HL or MAI HL .	Economics – most universities require MAA SL, MAA HL or MAI HL . Business – most universities require MAA SL, MAA HL or MAI HL .	Most universities require MAA SL, MAI HL or MAA HL , but some may consider MAI SL .
Singapore	Most universities accept both math courses at HL , but some may prefer MAA HL .	Most universities accept all four mathematics courses, but some may prefer MAA HL for certain programs.	Most universities accept all four mathematics courses, but some may prefer MAA HL or MAI HL for certain programs.	Mathematics is not a specific requirement for these courses at most universities.
South Korea	Mathematics is not a specific requirement for these courses at most universities.	Mathematics is not a specific requirement for these courses at most universities.	Mathematics is not a specific requirement for these courses at most universities.	Mathematics is not a specific requirement for these courses at most universities.
Spain	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses.
Switzerland	Most universities require MAA HL or MAI HL .	Most universities accept all four mathematics courses, but some universities may require MAA HL and MAI HL .	Most universities accept all four mathematics courses.	Most universities accept all four mathematics courses, but some universities may require MAA HL and MAI HL .
United Kingdom	Most universities accept both mathematics subjects at HL , but MAA HL is preferred. Some may consider MAA SL .	Mathematics is not a specific requirement for these courses at most universities.	Most universities accept both mathematics subjects at HL , but MAA HL is preferred. Some may consider both SL courses.	Mathematics is not a specific requirement for these courses at most universities.
United States	All four math courses are accepted for entry, but MAA HL and MAI HL may allow students to demonstrate they have taken the most academically rigorous programming.			

NOTE: Check the specific admissions guidance for the universities that students are interested in applying to and other sources of information, for example the [UCAS website](#). Also, refer to the [IB country and university recognition statements](#).



Contact us

If you have any questions contact recognition@ibo.org.



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