A Guide to the New Mathematics General Stage 6 Syllabus

The courses within the syllabus are effective from:

2013  Preliminary Mathematics General
2014  HSC Mathematics General 2
        HSC Mathematics General 1 (Content Endorsed Course)

The new Mathematics General Stage 6 Syllabus (available in the HSC Syllabuses section of the Board’s website) incorporates the Preliminary Mathematics General (Board Developed) course, the HSC Mathematics General 2 (Board Developed) course and the HSC Mathematics General 1 (Content Endorsed) course (CEC). The Preliminary Mathematics General course allows students to access either the HSC Mathematics General 2 course or the HSC Mathematics General 1 course in their HSC Year.


The HSC Mathematics General 1 course is an additional course in the suite of Stage 6 HSC mathematics courses. It has been designed to better meet the needs of students who wish to study mathematics in Stage 6 but whose purposes are not accommodated through the study of the HSC Mathematics General 2 course (see Broad Direction 1 in Broad Directions for the revision and development of Stage 6 Mathematics). As for other Content Endorsed Courses, the HSC Mathematics General 1 course will be subject to internal assessment only, and not formal examination at the HSC.

Components and weightings for internal assessment and HSC examination specifications for the HSC Mathematics General 2 course are available with the syllabus on the Board’s website, in the document Assessment and Reporting in the HSC Mathematics General 2 Course. Suggested components and weightings for internal assessment for the Preliminary Mathematics General course are also included in this document. Information in relation to the internal assessment of the HSC Mathematics General 1 course is included in the Mathematics General Stage 6 Syllabus document.

Features of the syllabus

- The Preliminary Mathematics General course, the HSC Mathematics General 2 course and the HSC Mathematics General 1 course are highly contextualised and provide opportunities for creative thinking, communication and problem-solving. Students learn to use a range of techniques and tools, including relevant technologies, in order to develop solutions to a wide variety of problems relating to their present and future needs and aspirations.
- The HSC Mathematics General 2 course and the HSC Mathematics General 1 course each build on the knowledge, skills and understanding gained through the study of the Preliminary Mathematics General course.
- The Preliminary Mathematics General/HSC Mathematics General 2 pathway provides a strong foundation for a broad range of vocational pathways, as well as for a range of university courses. The Preliminary Mathematics General/HSC Mathematics General 1 pathway provides an appropriate foundation for a range of such vocational pathways, either in the workforce or in further training.
Experience in problem-solving and modelling through the study of courses in the Mathematics Learning Area

Continuum of Learning for Stage 6 Mathematics General Students

Early Stage 1 to Stage 3 Mathematics

Stage 4 and Stage 5 Mathematics (including Life Skills outcomes and content)

Stage 6 Mathematics
Life Skills

Stage 6 – Preliminary Mathematics General
(BDC*)

Maintenance of eligibility for the HSC award
and an ATAR needs to be considered in choosing one of the two HSC courses below**

Stage 6 – HSC Mathematics General 1 (CEC*)

Stage 6 – HSC Mathematics General 2 (BDC*)

Workplace/Tertiary Courses/Other
Information from universities, TAFE colleges, etc., should be sought regarding assumed knowledge for particular courses offered by institutions in the tertiary sector

* BDC – Board Developed Course (HSC BDCs are examined at the HSC).
    CEC – Content Endorsed Course (HSC CECs are not examined at the HSC).

** The HSC Mathematics General 1 course (two units of study in the HSC Year) is a Content Endorsed Course and cannot be used to meet the requirement that, to be eligible for the HSC award, students must study at least six units of Board Developed Courses. Also, the two units of study for the HSC Mathematics General 1 course cannot be counted in the 10 units required for the calculation of an ATAR. For further information, please refer to the Board’s Assessment Certification Examination (ACE) website.
What is similar?

The content of the Preliminary Mathematics General/HSC Mathematics General 2 pathway is similar to the content of the 1999 General Mathematics Stage 6 Syllabus (note Broad Direction 8 in Broad Directions for the revision and development of Stage 6 Mathematics).

The Preliminary Mathematics General course, the HSC Mathematics General 2 course and the HSC Mathematics General 1 course are divided into the same five Strands. These Strands are, in general terms, the same as the Areas of Study in the General Mathematics course:

- Financial Mathematics
- Data and Statistics
- Measurement
- Probability
- Algebra and Modelling.

There is no intention that equal time be allocated to each Strand in the Preliminary General Mathematics course, the HSC Mathematics General 2 course or the HSC Mathematics General 1 course.

Programs written for the General Mathematics course can be modified to meet the requirements of the Strands in the new courses and many existing units of work will form the bases of effective programs. Many existing resources for the General Mathematics course will also continue to be relevant.

The approach to the coding of topics (FM1, FM2, etc) in the new courses is the same as in the General Mathematics course, although a particular code may not apply to the same aspects of content.

The information provided in the syllabus in relation to the content and to the teaching and learning of the courses is similar in its level of detail and presentation (see pages 5 and 6 of this guide) to that in the General Mathematics course.

What is different?

The Focus Studies in the Preliminary Mathematics General course, the HSC Mathematics General 2 course and the HSC Mathematics General 1 course are mandatory. Each of the Focus Studies is designed so that it can be programmed over a continuous time period. The Focus Studies provide students with the opportunity to apply and develop further the knowledge, skills and understanding initially developed in the Strands, as well as introducing some new mathematical content.

It is intended that students develop, through the Focus Studies, the capacity to integrate their knowledge, skills and understanding across the Strands, and that they are involved in identifying a broad range of up-to-date contextualised resources for interpretation and use in meeting the requirements of the Focus Studies. Many such resources can be found on the internet.

The Preliminary Mathematics General course contains two Focus Studies that have been designed for approximately one-third of the course time:

- Mathematics and Communication
- Mathematics and Driving.

The HSC Mathematics General 2 course contains two Focus Studies that have been designed for approximately one-third of the course time:

- Mathematics and Health
- Mathematics and Resources.

The HSC Mathematics General 1 course contains four Focus Studies that have been designed for approximately two-thirds of the course time:

- Mathematics and Design
- Mathematics and Household Finance
- Mathematics and the Human Body
- Mathematics and Personal Resource Usage.
What other materials is the Board providing in relation to the new Mathematics General Stage 6 Syllabus?

Following the release of the new syllabus, other materials will be made available for the information and assistance of teachers. These will include:

- *A Guide to the New Mathematics General Stage 6 Syllabus*
- *Assessment and Reporting in the HSC Mathematics General 2 Course*
- PowerPoint presentation for the introduction of the new syllabus
- Advice on initial programming
- Support materials for the teaching of new syllabus content
- HSC specimen examination paper, sample marking guidelines and performance band descriptions for the HSC Mathematics General 2 course
- Support for reporting achievement in the HSC Mathematics General 1 course.

**Note:**

The Department of Education and Communities, the Catholic Education Commission, other school systems, the Association of Independent Schools, and various professional associations will assist and support the ongoing implementation of the syllabus.
A Guide to the New Mathematics General Stage 6 Syllabus

Presentation of Content: Strand/Focus Study Overviews

**Strand: Data and Statistics**

Statistics relates to the collection, display, analysis and interpretation of information, or data. The study of Data and Statistics is important in developing student appreciation of the contribution that statistical thinking makes to decision-making in society, and in the professional and personal lives of individuals. Students need to develop their ability to utilise relevant data, data displays and statistical results. They need to learn how raw quantitative data is generated, summarised, presented, modelled and interpreted so that useful conclusions can be drawn.

In the Data and Statistics Strand in the Preliminary Mathematics General course, students focus on the importance of statistical processes and inquiry in society, the planning and management of data collection, the preparation of a variety of data displays, and the calculation of summary statistics for single data sets and their use in interpretation.

### Outcomes addressed

A student:

**MSP 1**: uses mathematics and statistics to compare alternative solutions to contextual problems

**MSP 2**: represents information in symbolic, graphical and tabular form

**MSP 3**: demonstrates awareness of issues in practical measurement, including accuracy, and the choice of relevant units

**MSP 4**: determines an appropriate form of organisation and representation of collected data

**MSP 5**: uses appropriate technology to organise information from a limited range of practical and everyday contexts

**MSP 6**: justify a response to a given problem using appropriate mathematical terminology

### Content summary

- **G21**: Statistical and society, data collection and sampling
- **G22**: Displaying and interpreting single data sets
- **G23**: Summary statistics

### Terminology

- basic chart
- bar chart
- line graph
- scatter plot
- pie chart
- histogram
- cumulative frequency polygon
- outlier
- mode
- median
- mean
- range
- lower quartile
- upper quartile
- quartile
- mean average
- mode
- median
- frequency
- frequency table
- range
- standard deviation
- variance
- normal distribution
- skewness
- skew
- median
- mean
- mode
- sample
- population
- data
- sample size

### Notes

- Learning and teaching, and assessment, materials should use current information from a range of sources, including, but not limited to, surveys, newspapers, journals, magazines, books and websites, and the internet.
- In the study of statistics and society, students should develop an understanding of the importance of analysing data in planning and decision-making by government and businesses.
- Students may have greater interest in data that relates to their life experiences or to data that they have generated themselves. This data may be collected by survey, measurement or simple experiment. A group survey by students may represent the entire population of interest or may represent a sample of the population.
- The Australian Bureau of Statistics publishes notes about graph types. Teachers may find these notes useful when giving students experience in the presentation of data displays.
- Students could collect, display and analyse data related to a course of study in another key learning area, e.g. fitness data in PHYSIC or attitude data in Geography, or results from a scientific experiment.
A Guide to the New Mathematics General Stage 6 Syllabus

Presentation of Content: Topics

The name of the topic and its code

A summary of the purpose/content of the topic

A list of course outcomes addressed in the study of the topic

The mathematical content to be addressed in the topic

A list of important considerations for teaching and learning the topic

A list of examples indicating the types of applications used to introduce and illustrate the mathematical content of the topic

FSD1. Costs of purchase and insurance

The principal focus of this topic is the calculation of motor vehicle purchase and insurance costs, and the interpretation of related tables and graphs.

Outcomes addressed

- MGP.1, MGP.2, MGP.6, MGP.8, MGP.7, MGP.3, MGP.6

Content

- Calculate the percentage increase in the value of a new vehicle after one year.
- Describe the different types of insurance available, including compulsory and non-compulsory third party, fire, and comprehensive insurance.
- Compare the cost and the related cost of insurance.
- Analyze the probability of accidents in relation to insurance costs.
- Calculate the cost of stamp duty payable using current rates.

Note: this is a linear function.

- Cost: the ratio of cost is constant. For example, at a price of $100 for a vehicle, the cost is $100. Note: this is a linear function.

- Cost: the cost of the purchase of different motor vehicles (cars and motorcycles only), including finance, transfer of registration, and insurance.

- Cost: the monthly repayments on a reducing balance personal loan using tables or an online calculator.

- Calculate the sale price of a car and the total amount repaid over the period of a loan.

Considerations

- Teachers should be sensitive to the situations and experiences of students when discussing accident statistics.
- Current interest rates for financing vehicles should be compared.
- Car loans are personal loans with a fixed monthly repayment. These loans are reducing balance loans and may be paid off in less time than the original term by increasing the monthly repayments, or by making additional payments.

Suggested applications

- Students make decisions about the most appropriate way to display data comparing new models, and one-year-old models, of cars.

Further discussion and investigation could include:
- How the results differ for a small or large car?
- How the results differ for motorcycles?

- Students also pose and investigate questions generated in classroom discussions.

- Given a set amount of money, students investigate the purchase of a vehicle and a report. The report should include selecting a vehicle, making calculations if additional funding is required, the type of lending institution and lending rate, the amount payable in stamp duty, the cost of transferring registration fees, and insurance costs.

- Students investigate and write a report on the factors that affect insurance premiums, the type of vehicle, the age of the driver, and where the vehicle is to be garaged. Statistics related to vehicle theft, and the gender and age of drivers in accidents, should also be examined when investigating the cost of insurance and making comparisons.

- Students could construct a bar graph to display the cost of insurance in different locations. The data could include the cost of insurance and a comparison made between the cost of insurance and relevant theft statistics.

- Students could construct a bar graph to display the cost of insurance in different locations. The data could include the cost of insurance and a comparison made between the cost of insurance and relevant theft statistics.

- Students could construct a bar graph to display the cost of insurance in different locations. The data could include the cost of insurance and a comparison made between the cost of insurance and relevant theft statistics.

- Students could construct a bar graph to display the cost of insurance in different locations. The data could include the cost of insurance and a comparison made between the cost of insurance and relevant theft statistics.