

數學課程架構

- 必修部分 **M** (基礎課題+非基礎課題)
- 選修部分 **M1** 單元一 (微積分與統計)
- **M2** 單元二 (代數與微積分)

學生選擇

- 選擇一：只修讀**M**（為數學能力較低或認為將來進修不會選擇某些對數學有要求的學系的學生而設）

- 修讀**M+M1**

(為將來在升學或職業上需對數學有多些認知的學生而設)

- 修讀**M+M2**

(為將來選修或從事與數學有關領域，並希望在中高階段學習更高深的數學知識的學生而設)

Maths Only? M1 or M2?

新高中數學M1&M2選科



我是否合適讀M1 或M2 ？

- 如果你對數學有興趣或不難在數學取得不錯的成績，你應該合適讀M1或M2。

那麼我讀M1 或M2那一科較好？

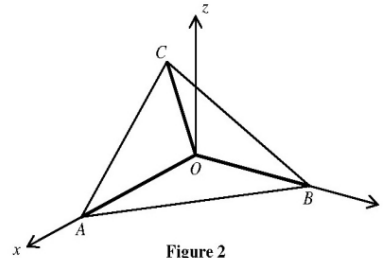
- 如果你對數學的理論比較有興趣，那麼你比較適合讀**M2**。
- 但如果你只對數學應用有興趣，那麼你比較適合讀**M1**了。

12. A staff of a school studies the school sick room utilization. The number of visits to the sick room per day on 100 randomly selected school days are recorded as follows:

Number of visits per day	0	1	2	3	4	5	6	7
Frequency	6	12	18	21	20	12	7	4

- (a) Find an unbiased estimate of the mean number of visits per day. (1 mark)
- M1**
- (b) (i) Find the sample proportion of school days with less than 4 visits per day.
 (ii) Construct an approximate 95% confidence interval for the proportion of school days with less than 4 visits per day. (3 marks)
- (c) Suppose the number of visits per day follows a Poisson distribution with mean λ . Assume that the unbiased estimate obtained in (a) is used for λ . The sick room is said to be *crowded* on a particular day if there are more than 3 visits on that day.
- (i) Find the probability that the sick room is *crowded* on a particular day.
 (ii) In a certain week of 5 school days, given that the sick room is *crowded* on at least 2 days, find the probability that the sick room is *crowded* on alternate days in the week. (6 marks)

12.



M2

Let $\vec{OA} = \mathbf{i}$, $\vec{OB} = \mathbf{j}$ and $\vec{OC} = \mathbf{i} + \mathbf{j} + \mathbf{k}$ (see Figure 2). Let M and N be points on the straight lines AB and OC respectively such that $AM : MB = a : (1-a)$ and $ON : NC = b : (1-b)$, where $0 < a < 1$ and $0 < b < 1$. Suppose that MN is perpendicular to both AB and OC .

- (a) (i) Show that $\vec{MN} = (a+b-1)\mathbf{i} + (b-a)\mathbf{j} + b\mathbf{k}$.
 (ii) Find the values of a and b .
 (iii) Find the shortest distance between the straight lines AB and OC . (8 marks)
- (b) (i) Find $\vec{AB} \times \vec{AC}$.
 (ii) Let G be the projection of O on the plane ABC , find the coordinates of the intersecting point of the two straight lines OG and MN . (5 marks)

M1

13. In a supermarket, there are two cashier counters: a regular counter and an express counter. It is known that 88% of customers pay at the regular counter. It is found that the waiting time for a customer to pay at the regular counter follows the normal distribution with mean 6.6 minutes and standard deviation 1.2 minutes.
- (a) Find the probability that the waiting time for a customer to pay at the regular counter is more than 6 minutes. (2 marks)
- (b) Suppose 12 customers who pay at the regular counter are randomly selected. Assume that their waiting times are independent.
- (i) Find the probability that there are more than 10 of the 12 customers each having a waiting time of more than 6 minutes.
- (ii) Find the probability that the average waiting time of the 12 customers is more than 6 minutes. (5 marks)
- (c) It is found that the waiting time for a customer to pay at the express counter follows the normal distribution with mean μ minutes and standard deviation 0.8 minutes. It is known that exactly 21.19% of the customers at the regular counter wait less than k minutes, while exactly 3.59% of the customers at the express counter wait more than k minutes.
- (i) Find k and μ .
- (ii) Two customers are randomly selected. Assume that their waiting times are independent. Given that both of them wait more than μ minutes to pay, find the probability that exactly one of them pays at the regular counter. (8 marks)

M2

13. (a) Let $f(x)$ be an odd function for $-p \leq x \leq p$, where p is a positive constant.
- Prove that $\int_0^{2p} f(x-p) dx = 0$.
- Hence evaluate $\int_0^{2p} [f(x-p) + q] dx$, where q is a constant. (4 marks)
- (b) Prove that $\frac{\sqrt{3} + \tan\left(x - \frac{\pi}{6}\right)}{\sqrt{3} - \tan\left(x - \frac{\pi}{6}\right)} = \frac{1 + \sqrt{3} \tan x}{2}$. (2 marks)
- (c) Using (a) and (b), or otherwise, evaluate $\int_0^{\frac{\pi}{3}} \ln(1 + \sqrt{3} \tan x) dx$. (4 marks)

如果我對數學沒有興趣，我是否不應讀M1或M2？

- 未必，如果你將來有志在四大院校修讀理科、工程系及一些財務分析管理學系的話，你應該考慮清楚，因為有修讀M 1 或M 2 會是收生的必須或優先條件。
- 大學中，有很多科目，雖然入學時沒有要求有修讀M 1 或M 2，但入學之後要修讀一定的統計學，所以M 1 對這類同學又有一定的幫助。

新高中成績計分方法

Level	5**	5*	5	4	3	2
得分	7	6	5	4	3	2

以最佳**5**科成績計算：
例如：劉X鵬 考獲

	中	英	數	通	M1/M2	中史	VA	西史
得分	4	3	4	3	3	3	6	3

$$\begin{aligned} \text{中} + \text{英} + \text{數} + \text{通} + \text{BEST X} &= 4 + 3 + 4 + 3 + 6 \\ &= 20 \end{aligned}$$

2014DSE

- 每年聯招收生1萬2仟多
- 全港**2014** DSE Best 5 subjects (包括中英數育通3322)
- 19-21分之中約**2千多**人有資格入大學

Total grade points	No of Candidates		Total grade points	No of Candidates
34 - 35	200		≥ 34	200
31 -33	727		≥ 31	927
28 - 30	1461		≥ 28	2388
25 - 27	2673		≥ 25	5061
22 - 24	5064		≥ 22	10125
19 - 21	7963		≥ 19	18088
16 - 18	7209		≥ 16	25297

2015DSE

- 每年聯招收生1萬2仟多
- 全港**2015 DSE Best 5 subjects** (包括中英數育通3322)
- 19-21分之中約**2千多**人有資格入大學

Total grade points	No of Candidates
34 - 35	194
31 -33	723
28 - 30	1322
25 - 27	2749
22 - 24	5056
19 - 21	8640
16 - 18	10691

Total grade points	No of Candidates
≥ 34	194
≥ 31	917
≥ 28	2239
≥ 25	4988
≥ 22	10044
≥ 19	18684
≥ 16	29375

2年比較

聯招收生1萬2仟多

Best 5(3322)	DSE2014	DSE2015
≥ 22	10125	10044
≥ 19	18088	18684
19-21	7963	8640

- 19-21分在2014年有7963人
- 在2015年有8640人
- 其中有2仟多人有入大學的機會

考生人數趨勢

	DSE2013	DSE2014	DSE2015	DSE2016
應考考生總數	81355	78401	72859	?
應考最少五科	72590	68425	63527	?
五科取得Level 4以上	13389	12903	12119	?

- 五科取得**20**分以上的成績，愈來愈容易進入大學

How to make a difference?

- 即同是20或21分的有數千人
- 多個X科考得好有沒有好處?
- M1/M2考得好有沒有好處?

科大收生調整 數學延

科技大學昨日舉行本科入學資訊日，吸引逾三萬名學生家長到場。科大一六學年的收生安排將有改動，在理學院的收生成績計算中，數學延伸部分可獲額外加分，希望鼓勵學生修讀M1、M2；而商學院部分學額，會由學院收生改為獨立學科收生，但有中六生認為學院收生始終較具彈性，較為吸引。另外，新開辦的「跨學科自選主修」，亦吸引不少同學查詢，有學生更希望將數學與環球商業學結合，認為一個自創的主修將來能令顧主另眼相看。

昨日下午天氣突然轉壞，但全日仍有大批學生和家長到科大入學資訊日，了解各科學習內容以及收生安排。部分課程的一六學年的入

學計分方法將會調整，其中在理學院及國際科研課程，數學延伸部分及英文科可獲一點五倍的加分。

商學院分拆 獨立收生

本科招生及入學事務處處長吳麗萍在解釋，調整是希望鼓勵學生修讀M1、M2。家長陳太表示，就讀中六的兒子在數學和物理較強，亦有修讀M2，認為調整對兒子有優勢，又指兒子很多同學已在中六退修M2。

科大另一個收生安排改動，就是商學院會將部分學額，分拆成獨立學科收生，如會計、量計金融等。但中六生黃同學認為，學院收生

332233

香港科技大學

科大各課程的基本入學要求

基本入學要求：● 4C + 2X (四科核心科目 + 兩科選修科目)，或

● 4C + 1X + M1/M2 (四科核心科目 + 一科選修科目 + 數學延伸單元)

- 大部分院校也將M1/M2看成一個X科
- 部分學系會把M1/M2分數 $\times 1.5$

個案二	中	英	數	通	M1/M2	1X	2X	3X
得分	4	4	5	3	6	5	5	6

- 中英數通+Best 2X
= $4+4+5+3+6+5 = 27$ 分
- 中英數通+ Best X +M1/M2
= $4+4+5+3+6+6 = 28$ 分
- 英數+ Best 4 = $4+5+6+5+5+6= 31$ 分

我在選科表選了修讀**M1**或**M2**，是否一定有得讀？

- 不一定，因為**M2**及**M1**各只有一班，選讀的同學的數學水平太低，將不能修讀；現數學成績不佳的同學，請加倍努力，提升數學成績，證明自己有能力讀！