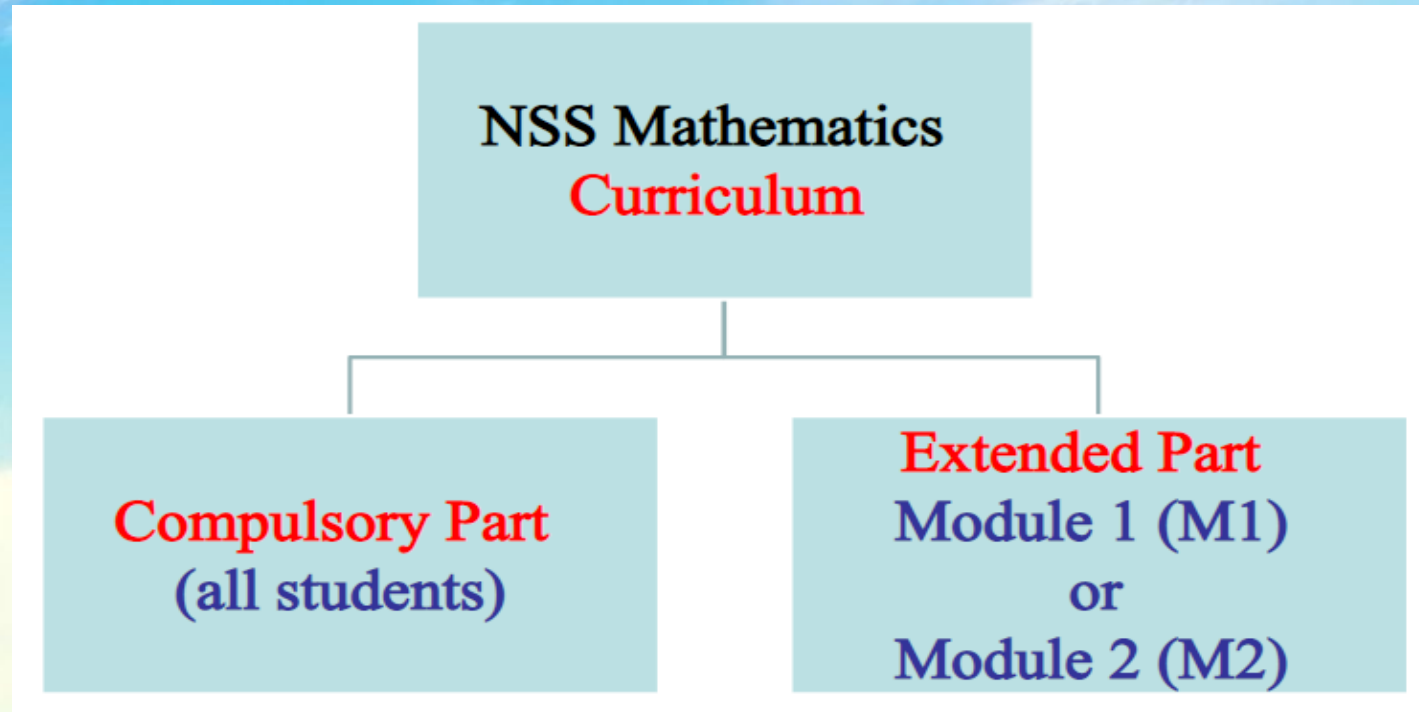


中學文憑試數學延伸課程的介紹

HKDSE Mathematics Extended Part

- Module 1 (M1)
- Module 2 (M2)
- By Mr Cheng Ho Yin

HKDSE 數學科的課程結構



M1 : Calculus and Statistics (微積分與統計)

M2 : Algebra and Calculus (代數與微積分)

同學應按自己的能力及升學來考慮選修延伸部分。

延伸部分簡介

- 延伸部分提供兩個單元 M1和 M2供學生選擇，學生最多只可修讀一個單元。
- 雖然延伸部分並不等於一個選修科目，但八大院校在2024年起將M1 和 M2視同一個選修科計算。
- 各開一班，每班名額 36人。

延伸部分簡介（續）

M1 (單元一) (微積分與統計)

- 為那些**將來在學科或職業上需要更多及更深入的數學知識**、並希望在中學階段多學習一些**數學應用的**學生而設。
- 提供微積分與統計的直觀概念、相關基本技能及有用工具。
- 強調**應用性**多於其嚴謹性。

M2 (單元二) (代數與微積分)

- 為那些希望**從事與數學有關的職業（例如工程師、精算師等）**，並希望在中學階段學習更高深的數學知識的學生而設。

延伸部分的課題內容

M1 (單元一)	M2 (單元二)
<u>Algebra</u> <ol style="list-style-type: none">1. Binomial expansion2. Exponential and Logarithmic functions <u>Differentiation</u> <ol style="list-style-type: none">3. Limits and Derivative4. Differentiation of5. Applications of differentiation <u>Integration</u> <ol style="list-style-type: none">6. Indefinite integration and its applications7. Definite integrals and its applications8. Estimate definite integrals by the trapezoidal rule	<u>Algebra (Basic)</u> <ol style="list-style-type: none">1. Odd and even functions2. Mathematical Induction3. Binomial Theorem4. More about Trigonometric functions <u>Differentiation</u> <ol style="list-style-type: none">5. Limits and the number e6. Differentiation7. Applications of differentiation <u>Integration</u> <ol style="list-style-type: none">8. Indefinite integration and its applications9. Definite integration10. Application of definite integration

延伸部分的課題內容（續）

M1 (單元一)

Statistics (Probability and Distributions)

- 9. Review on basic statistic and probability
- 10. Conditional probability and Bayes' theorem
- 11. Discrete probability distributions
- 12. Some special discrete probability distributions
- 13. Normal distribution and its applications
- 14. Point and interval estimation

M2 (單元二)

Algebra (Advanced)

- 11. Matrices and Determinants
- 12. Systems of Linear Equations
- 13. Introduction to Vectors
- 14. Scalar products and Vector products
- 15. Applications of Vectors

延伸部分考試模式

Hong Kong Diploma of Secondary Education Examination			
Component		Weighting	Duration
Compulsory Part	Paper 1 Conventional questions	65%	2 hours 15 minutes
	Paper 2 Multiple-choice questions	35%	1 hour 15 minutes
Module 1	Conventional questions	100%	2 hours 30 minutes
Module 2	Conventional questions	100%	2 hours 30 minutes


- 考生在必修部分及延伸部分的成績會分開匯報。
- 數學科暫時尚未施行校本評核。

為何修讀數學科延伸部分？

1. 對大學大部分選科有利。
2. 大學商科（M1）、工程科（M2）、
科研科（M2）必需修讀。



General Entrance Requirements of UGC-funded Undergraduate Programmes

Universities	Basic Requirements (Chinese, English, Mathematics, Citizenship and Social Development* and Electives)	Counting M1/M2 as equivalence to an elective
 City University of Hong Kong	332A33	✓
 Hong Kong Baptist University	332A33	✓
 Lingnan University	332A22	✓
 The Chinese University of Hong Kong #	332A33	✓
 The Education University of Hong Kong	332A22	✓
 The Hong Kong Polytechnic University	332A33	✓
 The Hong Kong University of Science and Technology #	332A33	✓
 The University of Hong Kong #	332A33	✓

* An attainment at “Attained (A)” in “Citizenship and Social Development” is required for meeting the entrance requirement.
The requirements are subject to relevant University committees’ final approval.

數學延伸部分的認受性

General Entrance Requirements

<https://www.jupas.edu.hk/en/programmes-offered/hku/>

<https://www.jupas.edu.hk/en/programmes-offered/cuhk/>

<https://www.jupas.edu.hk/en/programmes-offered/hkust/>

八大院校在2024年起將M1 和 M2視同一個選修科計算；

大部分院校亦以最佳五科計分

數學延伸部分的認受性



HKU 2025 Admissions Information for JUPAS STUDENTS

Programmes with Subject Weightings

Eng = English | Chin = Chinese | Math = Mathematics

CSO / LS = Citizenship and Social Development / Liberal Studies | Sci = Science

* The scoring formula considers category A subjects and M1 / M2 only, unless otherwise specified.

For the latest information for 2025 admissions, please refer to our website (hku.hk/dse).



										With Reference to Admissions 2024			
Programme		Programme Scoring Formula*	Minimum Level Required						Specific Elective Subjects/ Other Requirements	Programme Scoring Formula*	Upper Quartile	Median	Lower Quartile
			Eng	Chin	Math	CSO / LS	1 st Elective Subject	2 nd Elective Subject / M1 / M2					
Li Ka Shing Faculty of Medicine													
6456	Bachelor of Medicine and Bachelor of Surgery	Best 6 Subjects	4	3	2	Attained (A)/2	3	3	Level 3 or above in one of the following subjects: Chemistry, or Combined Science with Chemistry component. A good working knowledge of Cantonese is required.	Best 6 Subjects	45	44	42
6468	Bachelor of Nursing	Best 5 Subjects ^a + 0.5 x 6th Best Subject ^a	3	3	2	Attained (A)/2	3	3	A good working knowledge of Cantonese is required.	Best 5 Subjects ^a + 0.5 x 6th Best Subject ^a	27	26	25
6482	Bachelor of Chinese Medicine	Best 5 Subjects ^a + 0.5 x 6th Best Subject ^a	3	3	2	Attained (A)/2	3	3	Level 3 or above in one of the following subjects: Biology, Chemistry, Combined Science, Integrated Science, or Physics. A good command of written and spoken Chinese (Cantonese and Putonghua) is required.	Best 5 Subjects ^a + 0.5 x 6th Best Subject ^a	33	32	31
6494	Bachelor of Pharmacy	Best 6 Subjects	4	3	2	Attained (A)/2	3	3	Level 3 or above in one of the following subjects: Chemistry, or Combined Science with Chemistry component. A good working knowledge of Cantonese is required.	Best 6 Subjects	39	39	37
6949	Bachelor of Biomedical Sciences	Best 6 Subjects	4	3	2	Attained (A)/2	3	3	Level 3 or above in one of the following subjects: Biology, Chemistry, Combined Science with Biology component, or Combined Science with Chemistry component.	Best 6 Subjects	41	39	39
Faculty of Science													
6688	Science Master Class	Eng + Math + Best 2 from Biology / Chemistry / Physics / M1 / M2 + Best Subject with WEIGHTING 5	3	3	4	Attained (A)/2	3	3	Level 3 or above in two of the following subjects: Biology, Chemistry, Mathematics Extended Part (Module 1 or 2), or Physics.	Eng + Math + Best 2 from Biology / Chemistry / Physics / Combined Science ^c / M1 / M2 + Best Subject ^c with WEIGHTING 5	38	35	33
6858	Bachelor of Science and Bachelor of Laws	2 x Eng + 2 x Math / M1 / M2 + 2 x Best Sci Subject ^b + Best 3 Subjects	5	4	2	Attained (A)/2	3	3	Level 3 or above in one of the following subjects: Biology, Chemistry, or Physics.	2 x Eng + 2 x Math / M1 / M2 + 2 x Best Sci Subject ^c + Best 3 Subjects	57	54	53
6901	Bachelor of Science	Eng + 1.5 x Math + 1.5 x Best Sci Subject ^b + Best 2 Subjects with WEIGHTING 6	3	3	2	Attained (A)/2	3	3	Level 3 or above in one of the following subjects: Biology, Chemistry, or Physics.	Eng + 1.5 x Math + 1.5 x Best Sci Subject ^c + Best 2 Subjects with WEIGHTING 6	37	34	33

Notes:

^a May include M1/M2 or Category C subject, whichever is higher.

^b "Sci Subject" refers to one of the following subjects, namely Biology, Chemistry, and Physics.

^c "Sci Subject" refers to one of the following subjects, namely Biology, Chemistry, Combined Science, Integrated Science and Physics.

^d The components of Combined Science must not overlap with other science elective.

Remarks:

Conversion of levels to scores (category A): 5**=8.5, 5*=7, 5=5.5, 4=4, 3=3, 2=2, 1=1, Others=0

Conversion of grades to scores (category Q): Please refer to our website (hku.hk/dse).

The result(s) of Liberal Studies, Combined Science and Integrated Science achieved in previous sitting(s) will also be considered.

The 6th and 7th subjects in the scoring formula are only considered if applicable. Students holding 5 calculable subjects are still eligible for consideration.

Disclaimer:

The above information is a reference for local HKDSE students only. It should not be used to predict the chance of admissions to any programmes.

哪些同學適合修讀數學科延伸部分？

SECTION B (50 marks)

9. In a city, the antibody level of a virus of a citizen follows a normal distribution with a mean of μ units and a standard deviation of 20 units.

- (a) A medical inspection is conducted to estimate μ . A random sample of 30 citizens of the city is selected and their antibody levels are recorded below.

Antibody level (x units)	Number of citizens
$10 < x \leq 40$	4
$40 < x \leq 70$	9
$70 < x \leq 100$	10
$100 < x \leq 130$	7

Construct a 98.5% confidence interval for μ . (4 marks)

- (b) Another random sample of 34 citizens of the city is selected. It is found that the mean of the antibody levels for this sample is 79 units. This sample is combined with the sample in (a). The upper limit of a constructed $\alpha\%$ confidence interval for μ using the combined sample is 82.9. Find α correct to the nearest integer. (4 marks)

- (c) Suppose $\mu = 76$. If the antibody level of a citizen is higher than 60 units, the citizen is classified as *well protected*; otherwise the citizen is *insufficiently protected*.

- (i) Find the probability that a citizen of the city is *well protected*.
- (ii) A random sample of 16 citizens of the city is selected and their antibody levels are inspected one by one. Given that at least 3 selected citizens are *insufficiently protected*, find the probability that exactly 3 among the final 5 citizens are *well protected*.

(5 marks)

in the margins will not be marked.

in the margins will not be marked.

哪些同學適合修讀數學科延伸部分？

8. (a) Let $\theta \in \mathbb{R}$. Using mathematical induction, prove that $\sin \theta \sum_{k=1}^n \sin 2k\theta = \sin n\theta \sin(n+1)\theta$ for all positive integers n .

Solution	Marks
<p>8. (a) Note that $\sin \theta \sum_{k=1}^1 \sin 2k\theta = \sin \theta \sin(1+1)\theta = \sin \theta \sin 2\theta$.</p> <p>Therefore, the statement is true for $n = 1$.</p> <p>Assume that $\sin \theta \sum_{k=1}^m \sin 2k\theta = \sin m\theta \sin(m+1)\theta$, where m is a positive integer.</p> $\begin{aligned} & \sin \theta \sum_{k=1}^{m+1} \sin 2k\theta \\ &= \sin \theta \sum_{k=1}^m \sin 2k\theta + \sin \theta \sin 2(m+1)\theta \\ &= \sin m\theta \sin(m+1)\theta + \sin \theta \sin 2(m+1)\theta \quad (\text{by induction assumption}) \\ &= \frac{1}{2}(\cos \theta - \cos(2m+1)\theta) + \frac{1}{2}(\cos(2m+1)\theta - \cos(2m+3)\theta) \\ &= \frac{1}{2}(\cos \theta - \cos(2m+3)\theta) \\ &= \frac{-1}{2} \left(2 \sin \left(\frac{\theta + (2m+3)\theta}{2} \right) \sin \left(\frac{\theta - (2m+3)\theta}{2} \right) \right) \\ &= \sin(m+1)\theta \sin(m+2)\theta \end{aligned}$ <p>So, the statement is true for $n = m+1$ if it is true for $n = m$. By mathematical induction, the statement is true for all positive integers n.</p>	<p>1</p> <p>1M</p> <p>1M</p> <p>1</p>

哪些同學適合修讀數學科延伸部分？

1. 只喜歡計數，無時無刻都在思考數學問題。
2. 很喜歡計數，但數學唔算高分。
3. 不太鍾意計數，但數學成績好。
4. 連計算 $0.3 \div 2$ 都要用計數機。

答案：

1. 歡迎修讀！
2. 需要慎重考慮．．．
3. 如對升學有幫助，應考慮修讀。
4. 不適宜修讀！

2024 年香港中學文憑考試
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2024

全體考生各科成績統計
Analysis of Results of All Candidates by Subject

ALL

甲類學科：高中科目

Category A: Senior Secondary Subjects

科目 Subject		出席 人數 No. Sat	中文作答 Chinese Version %	考生考獲各等級的百分率 Percentage of levels awarded							
				5**	5*+	5+	4+	3+	2+	1+	U
數學 Mathematics	必修部分 Compulsory Part	44 974	40.8	1.6	6.4	16.0	39.2	59.1	82.5	92.0	8.0
	延伸部分（微積分與統計） Extended Part (Calculus and Statistics)	2 856	23.3	3.6	13.1	29.8	51.4	70.3	86.6	94.2	5.8
	延伸部分（代數與微積分） Extended Part (Algebra and Calculus)	5 523	18.4	4.2	15.0	36.8	57.9	79.6	92.3	97.8	2.2

$$+ h \{a_n\}^k \varphi \circ U$$