

(Study Scheme - English)

Programme Title

Mathematics and Applied Mathematics

Study Scheme

Applicable to students admitted in 2020-21 and thereafter

Major Programme Requirement

Studies in Mathematics and Applied Mathematics are divided into THREE main streams and students are required to specialize in one of the streams:

- (1) Pure mathematics;
- (2) Applied mathematics; and
- (3) Financial mathematics

Pure Mathematics Stream

Students are required to complete a minimum of 70 units of courses as follows:

	Units
1. School Package: BIO1001, CHM1001, CSC1001, 1002, MAT1011, 1012[a], 2040, PHY1001, STA2001	25
2. Required Courses: MAT2002, 2006, 2007, 3004, 3006, 3253, 4002, 4033, 4220	27
3. Elective Courses: Six courses selected from the following: CSC3001, FMA4800, MAT3005, 3007, 3040, 3093, 3220, 3280, 3300, 3350, 4001, 4003, 4004, 4005, 4010, 4500, PHY1002, 4221, STA4001	18
Total:	70

Applied Mathematics Stream

Students are required to complete a minimum of 70 units of courses as follows:

	Units
1. School Package: BIO1001, CHM1001, CSC1001, 1002, MAT1011, 1012[a], 2040, PHY1001, STA2001	25
2. Required Courses:	

MAT2002, 2006, 2007, 3006, 3007, 3253, 3300, 4001, 4220 27

3. Elective Courses:

Six courses selected from the following: 18
BIM3001, CHM2002, CSC3001, 3002, 3100, DDA2020, FMA4800,
MAT3004, 3040, 3093, 3220, 3280, 3350, 4002, 4003, 4004, 4005,
4010, 4033, 4240, 4500, PHY1002, 2001, 3002, 3011, 3201, 4221,
4260, STA4001

Total: 70

Financial Mathematics Stream

Students are required to complete a minimum of 70 units of courses as follows:

Units

1. School Package:

BIO1001, CHM1001, CSC1001, 1002, MAT1011, 1012[a], 2040, 25
PHY1001, STA2001

2. Required Courses:

ECO3121, FIN3080, MAT2002, 2006, 2007, 3280, 4001, STA2002, 27
4001

3. Elective Courses:

Six courses selected from the following: 18
ECO2011, 3410, FIN2010, 4110, 4120, FMA4200, 4800, MAT3006,
3007, 3040, 3220, 3300, 4220, 4240, 4500, PHY1002, RMS4001,
4050, 4060, STA4004

Total: 70

Notes:

[a] Students can choose to take either MAT1011 and MAT1012 or MAT1001 and MAT1002 to fulfill the graduation requirement.

[b] Courses included in the calculation of Major GPA for honors classification:

a) Pure Mathematics Stream

CSC3001, FMA4800, PHY4221, STA4001 and MAT courses at 2000 and above level.

b) Applied Mathematics Stream

BIM3001, CHM2002, CSC3001, 3002, 3100, DDA2020, FMA4800, PHY2001, 3002, 3011, 3201, 4221, 4260, STA4001 and MAT courses at 2000 and above level.

c) Financial Mathematics Stream

ECO2011, 3121, 3410, FIN3080, 4110, 4120, FMA4200, 4800, RMS4001, 4050, 4060, STA2002, 4001, 4004 and MAT courses at 2000 and above level.

(Study Scheme - Chinese)

課程名稱

數學與應用數學

修讀辦法

二〇二〇至二一年度及以後入學學生適用

主修課程要求

本課程分設三項專修範圍，學生須選修其中一項專修範圍：

- (1) 理論數學；
- (2) 應用數學；及
- (3) 金融數學。

理論數學專修範圍

學生須至少修畢以下科目共 70 學分：

	學分
1. 學院課程： BIO1001, CHM1001, CSC1001, 1002, MAT1011, 1012[a], 2040, PHY1001, STA2001	25
2. 必修科目： MAT2002, 2006, 2007, 3004, 3006, 3253, 4002, 4033, 4220	27
3. 選修科目： 從以下選修其中六科： CSC3001, FMA4800, MAT3005, 3007, 3040, 3093, 3220, 3280, 3300, 3350, 4001, 4003, 4004, 4005, 4010, 4500, PHY1002, 4221, STA4001	18
共：	70

應用數學專修範圍

學生須至少修畢以下科目共 70 學分：

	學分
1. 學院課程： BIO1001, CHM1001, CSC1001, 1002, MAT1011, 1012[a], 2040, PHY1001, STA2001	25
2. 必修科目： MAT2002, 2006, 2007, 3006, 3007, 3253, 3300, 4001, 4220	27

3. 選修科目：	
從以下選修其中六科：	18
BIM3001, CHM2002, CSC3001, 3002, 3100, DDA2020, FMA4800, MAT3004, 3040, 3093, 3220, 3280, 3350, 4002, 4003, 4004, 4005, 4010, 4033, 4240, 4500, PHY1002, 2001, 3002, 3011, 3201, 4221, 4260, STA4001	
共：	70

金融數學專修範圍

學生須至少修畢以下科目共 70 學分：

	學分
1. 學院課程：	
BIO1001, CHM1001, CSC1001, 1002, MAT1011, 1012[a], 2040, PHY1001, STA2001	25
2. 必修科目：	
ECO3121, FIN3080, MAT2002, 2006, 2007, 3280, 4001, STA2002, 4001	27
3. 選修科目：	
從以下選修其中六科：	18
ECO2011, 3410, FIN2010, 4110, 4120, FMA4200, 4800, MAT3006, 3007, 3040, 3220, 3300, 4220, 4240, 4500, PHY1002, RMS4001, 4050, 4060, STA4004	
共：	70

註：

[a] 學生可以修讀 MAT1001, MAT1002 或 MAT1011, MAT1012 以滿足畢業要求。

[b] 下列科目將會計入主修科目之平均績點，並用以釐定學位等級：

a) 理論數學專修範圍

CSC3001, FMA4800, PHY4221, STA4001, MAT 科目中 2000 及以上程度的科目；

b) 應用數學專修範圍

BIM3001, CHM2002, CSC3001, 3002, 3100, DDA2020, FMA4800, PHY2001, 3002,
3011, 3201, 4221, 4260, STA4001, MAT 科目中 2000 及以上程度的科目；

c) 金融數學專修範圍

ECO2011, 3121, 3410, FIN3080, 4110, 4120, FMA4200, 4800, RMS4001, 4050, 4060,
STA2002, 4001, 4004, MAT 科目中 2000 及以上程度的科目。

(Recommended Course Pattern - English)

Recommended Course Pattern

1. Sufficient units should be allowed in each term for students to fulfill the University Core Requirements, which include: (i) 3 units of Chinese; (ii) 12 units of English; (iii) 1 unit of IT; (iv) 18 units of General Education; and (v) 2 units of Physical Education and Health.
2. Programmes with different streams/concentrations are required to provide the recommended pattern for each stream/concentration.

Major Programme Requirement of <u>Mathematics and Applied Mathematics</u>		
	Recommended Course Pattern	Units
First Year of Attendance	1 st term School Package: CHM1001, CSC1001, MAT1011	9
	2 nd term School Package: CSC1002, MAT1012, PHY1001, STA2001	10
Second Year of Attendance	1 st term School Package: MAT2040 Major Required: MAT2006	3 3
	2 nd term School Package: BIO1001 Major Required: MAT2002, 2007, 3253 ^{[1][2]} , STA2002 ^[3]	3 9
Third Year of Attendance	1 st term Major Required: ECO3121 ^[3] , MAT3004 ^[1] , 3006 ^{[1][2]} , 3280 ^[3] , 4001 ^{[2][3]} , 4220 ^{[1][2]} Major Elective(s): one course	9 3
	2 nd term Major Required: MAT3007 ^[2] , 4002 ^[1] , STA4001 ^[3] Major Elective(s): one course	3 3
Fourth Year of Attendance	1 st term Major Required: FIN3080 ^[3] , MAT3300 ^[2] , 4033 ^[1] Major Elective(s): two courses	3 6
	2 nd term Major Elective(s): two courses	6
Total (Major Requirement including School Package):		70

Explanatory Notes:

- [1] Applicable to Pure Mathematics Stream only.
 [2] Applicable to Applied Mathematics Stream only.
 [3] Applicable to Financial Mathematics Stream only.

(Recommended Course Pattern – Chinese)

修課推介

1. 每學期均須預留足夠學分讓同學符合大學核心課程要求，包括：(一) 中文三學分；(二) 英文十二學分；(三) 信息科技一學分；(四) 通識教育十八學分及 (五) 體育與健康兩學分。
2. 有不同專修範圍的課程須為每項專修範圍提供修課推介。

數學與應用數學主修課程要求		
	修課推介	學分
第一修業學年	第一學期 學院課程: CHM1001, CSC1001, MAT1011	9
	第二學期 學院課程: CSC1002, MAT1012, PHY1001, STA2001	10
第二修業學年	第一學期 學院課程: MAT2040 主修必修科目: MAT2006	3 3
	第二學期 學院課程: BIO1001 主修必修科目: MAT2002, 2007, 3253 ^{[1][2]} , STA2002 ^[3]	3 9
第三修業學年	第一學期 主修必修科目: ECO3121 ^[3] , MAT3004 ^[1] , 3006 ^{[1][2]} , 3280 ^[3] , 4001 ^{[2][3]} , 4220 ^{[1][2]} 主修選修科目: 一科	9 3
	第二學期 主修必修科目: MAT3007 ^[2] , 4002 ^[1] , STA4001 ^[3] , 主修選修科目: 一科	3 3
第四修業學年	第一學期 主修必修科目: FIN3080 ^[3] , MAT3300 ^[2] , 4033 ^[1] 主修選修科目: 兩科	3 6
	第二學期 主修選修科目: 兩科	6
合共 (主修要求包括學院課程):		70

註：

- [1] 只用於理論數學專修範圍。
- [2] 只適用於應用數學專修範圍。
- [3] 只適用於金融數學專修範圍。

Course List

I. School Package for the School of Science and Engineering

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
BIO1001	General Biology	普通生物	3
CHM1001	General Chemistry	普通化學	3
CSC1001	Introduction to Computer Science: Programming Methodology	計算機科學導論：程序設計方法	3
CSC1002	Computational Laboratory	計算機實驗	1
Option A*	MAT1001	Calculus I	微積分（一）
	MAT1002	Calculus II	微積分（二）
Option B*	MAT1011	Calculus (Extended) I	微積分精講（一）
	MAT1012	Calculus (Extended) II	微積分精講（二）
MAT2040	Linear Algebra	線性代數	3
PHY1001	Mechanics	力學	3
STA2001	Probability and Statistics I	概率及統計（一）	3

* Remark: Students can choose to take either Option A or Option B to fulfill the graduate requirement.

II. Major required courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
ECO3121	Introductory Econometrics	計量經濟學導論	3
FIN3080	Investment Analysis and Portfolio Management	投資分析和投資組合管理	3
MAT2002	Ordinary Differential Equation	常微分方程	3
MAT2006	Elementary Real Analysis	基礎實分析	3
MAT2007	Elementary Real Analysis II	基礎實分析（二）	3
MAT3004	Abstract Algebra I	抽象代數（一）	3
MAT3006	Real Analysis	實分析	3
MAT3007	Optimization	最優化	3
MAT3280	Probability Theory	概率論	3
MAT3253	Complex Variables	複變函數	3
MAT3300	Mathematical Modeling	數學建模	3
MAT4001	Numerical Analysis	數值分析	3
MAT4002	Introduction to Geometry and Topology	幾何與拓撲學導論	3
MAT4033	Differential Geometry	微分幾何	3
MAT4220	Partial Differential Equation	偏微分方程	3
STA2002	<u>Probability and Statistics II</u>	概率及統計（二）	3
STA4001	Stochastic Processes	隨機過程	3

III. Major Elective courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
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BIM3001	Bioinformatics	生物信息學	3
CHM2002	Physical Chemistry	物理化學	3
CSC3001	Discrete Mathematics	離散數學	3
CSC3002	Introduction to Computer Science: Programming Paradigms	計算機科學導論：程序設計範式	3
CSC3100	Data Structures	數據結構	3
DDA2020*	Machine Learning	機器學習	3
ECO2011	Microeconomics	微觀經濟學	3
ECO3410	Economics of Money and Financial Institutions	貨幣與金融機構經濟學	3
FIN2010	Financial Management	財務管理	3
FIN4110	Futures and Options	期貨與期權	3
FIN4120	Fixed Income Securities Analysis	固定收益證券分析	3
FMA4200	Financial Data Analysis	金融數據分析	3
FMA4800	Financial Computation	金融計算	3
MAT3004	Abstract Algebra I	抽象代數（一）	3
MAT3005	Abstract Algebra II	抽象代數（二）	3
MAT3006	Real Analysis	實分析	3
MAT3007	Optimization	最優化	3
MAT3040	Advanced Linear Algebra	高等线性代数	3
MAT3093	Fourier Analysis	傅立葉分析	3
MAT3220*	Optimization II	最優化（二）	3
MAT3280	Probability Theory	概率論	3
MAT3300	Mathematical Modeling	數學建模	3
MAT3350	Selected Topics in Information Theory	信息論專題	3
MAT4001	Numerical Analysis	數值分析	3
MAT4002	Introduction to Geometry and Topology	幾何與拓撲學導論	3
MAT4003	Number Theory	數論	3
MAT4004	Graph Theory	圖論	3
MAT4005*	Introduction to Coding and Cryptography	編碼及密碼學導論	3
MAT4010	Functional Analysis	泛函分析	3
MAT4033	Differential Geometry	微分幾何	3
MAT4220	Partial Differential Equation	偏微分方程	3
MAT4240	Numerical Methods for Differential Equations	微分方程數值解	3
MAT4500	Stochastic Differential Equation	隨機微分方程	3
PHY1002	Physics Laboratory	物理實驗	2
PHY2001	Electricity and Magnetism	電磁學	3
PHY3002	Electrodynamics	電動力學	3
PHY3011	Theoretical Mechanics	理論力學	3
PHY3201	Quantum Physics	量子物理	3
PHY4221	Quantum Mechanics	量子力學	3
PHY4260	Statistical Mechanics	統計力學	3

RMS4001	Simulation Methods for Risk Management and Finance	金融及風險管理模擬方法	3
RMS4050	Stochastic Calculus for Finance and Risk	金融與風險之隨機微積分	3
RMS4060	Risk Management with Derivatives	風險管理及衍生工具	3
STA4001	Stochastic Processes	隨機過程	3
STA4004	Actuarial Science	精算學	3

* The course title of CSC4020 is Fundamental of Machine Learning for students who study the course before 2021-22 term 1. For students who study this course from 2021-22 term 1, the course code is DDA2020 and the course title is Machine Learning.

在 2021-22 學年第一學期前修讀 CSC4020，科目名稱為「機器學習之基礎課程」。在 2021-22 學年第一學期及以後修讀該科目，科目代碼及名稱分別為「DDA2020」及「機器學習」。

* The course title of MAT3220 is Operations Research for students who study the courses in 2015, 2016 and 2017. For students who study MAT3220 from 2018-19 term 1, the course title is Optimization II.

在 2015，2016 及 2017 學年修讀 MAT3220，科目名稱為「運籌學」。在 2018-19 學年第一學期及以後修讀 MAT3220，科目名稱為最優化（二）。

* The course code of Introduction to Coding and Cryptography is IER4005 for students who study the course before 2019. For students who study Introduction to Coding and Cryptography from 2019-20 term 1, the course code is MAT4005.

在 2019 學年之前修讀編碼及密碼學導論，課程代碼為 IER4005。在 2019-20 學年第一學期及以後修讀編碼及密碼學導論，課程代碼為 MAT4005。