Programme Title
Data Science and Big Data Technology

Study Scheme

Applicable to students admitted in 2022-23

Major Programme Requirement

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

		Units
1.	School Package: BIO1008, CSC1001, 1002, DDA2001, MAT1001, 1002, 2041, PHY1001, STA2001H	25
2.	Required Courses: CSC3100, DDA3020, 4002, MAT3007, STA2002H, 4001	18
3.	Elective Courses: Any 27 credit units selected from the following streams (see Note [b]), with up to two 2000 level courses:	27

    i) Methodology and Theory Stream
    CSC3001, DDA3003, 3005, 4010, 4080, 4210, 4230, 4240, 4250, 4320, MAT2002, 2050, 3220, 3280, STA3020, 3005

    ii) Finance and Economics Stream
    DDA4080, ECO3121, 3160, 3211, 4121, FIN3080, FMA4200, 4800, STA4002, 4003, 4020

    iii) Operations Management Stream
    DDA4080, 4260, DMS2030, 3210, 4010, 4031, ECO3160, MGT2020, 4270, MKT4220

    iv) Life Science Stream
    BIM2005, 2006, 3001, 3007, 3009, BIO3204, 3213, DDA4080, STA4012

    v) Computing Stream
    CSC2003, 3001, 3002, 3050, 3150, 3160, 3170, 4001, 4005, 4010, 4120, 4140, 4150, 4160, 4170, DDA4080, 4107, 4220, 4310, ERG3010

Total:	**70**

Notes:

[a]　　All School Package (except BIO1008 and PHY1001), Major Required and Major Elective courses will be included in the calculation of Major GPA for honours classification.

[b]　　Streams of Specialization
There are five streams of specialization: Methodology and Theory Stream, Finance and Economics Stream, Operations Management Stream, Life Science Stream, and Computing Stream. Students may choose to specialize in one of the five streams by selecting the courses as prescribed. To qualify for a specialized stream, students must complete at least 4 courses under the stream. Students can only declare one stream of specialization at their expected graduation term. Students may also decide not to declare any Stream, in which case they will not be subject to the Stream requirements.

課程名稱
數據科學與大數據技術

修讀辦法

<div align="center">

二〇二二至二三年度入學學生適用

</div>

主修課程要求

學生須至少修畢以下科目共 70 學分：

學分

1. 學院課程：

   BIO1008, CSC1001, 1002, DDA2001, MAT1001, 1002, 2041, PHY1001, STA2001H   25

2. 必修科目：

   CSC3100, DDA3020, 4002, MAT3007, STA2002H, 4001   18

3. 選修科目：

   從以下方向中選修 27 學分，當中最多含兩門 2000 級科目（见注 [b]）：   27

   i) 方法論和理論方向
   CSC3001, DDA3003, 3005, 4010, 4080, 4210, 4230, 4240, 4250, 4320, MAT2002, 2050, 3220, 3280, STA3020, 3005

   ii) 金融及經濟方向
   DDA4080, ECO3121, 3160, 3211, 4121, FIN3080, FMA4200, 4800, STA4002, 4003, 4020

   iii) 運籌管理方向
   DDA4080, 4260, DMS2030, 3210, 4010, 4031, ECO3160, MGT2020, 4270, MKT4220

   iv) 生命科學方向
   BIM2005, 2006, 3001, 3007, 3009, BIO3204, 3213, DDA4080, STA4012

   v) 計算方向
   CSC2003, 3001, 3002, 3050, 3150, 3160, 3170, 4001, 4005, 4010, 4120, 4140, 4150, 4160, 4170, DDA4080, 4107, 4220, 4310, ERG3010

   共：   **70**

註：

[a] 所有學院課程（除 BIO1008 和 PHY1001）、主修必修和主修選修科目將會計入主修科目之平均績點，并用以釐定學位等級。

[b] 專修方向
本課程提供五項專修方向供學生修讀：方法論和理論；金融及經濟；運籌管理；生命科學；計算。學生可選擇一個方向，修讀指定科目。學生選修其中一個專修方向須於該方向修畢至少 4 門科目。方向申報將於學生預計毕业学期進行。學生僅可以申報一個專業方向，也可以不选择专业方向（如未選擇方向，則不受特定方向修课要求的限制）。

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>Data Science and Big Data Technology</u>	
	Recommended Course Pattern	**Units**
First Year of Attendance	1st term School Package: MAT2041, CSC1001, MAT1001	9
	2nd term School Package: CSC1002, DDA2001, MAT1002, PHY1001	10
Second Year of Attendance	1st term School Package: BIO1008, STA2001H Major Required: CSC3100	6 3
	2nd term Major Required: DDA3020, MAT3007, STA2002H	9
Third Year of Attendance	1st term Major Required: STA4001 Major Elective(s): two courses	3 6
	2nd term Major Required: DDA4002 Major Elective(s): two courses	3 6
Fourth Year of Attendance	1st term Major Elective(s): three courses	9
	2nd term Major Elective(s): two courses	6
Total (Major Requirement including School Package):		**70**

Last Update: 31 August 2024

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。

	數據科學與大數據技術主修課程要求	
	修課推介	學分
第一修業學年	第一學期 學院課程: MAT2041, CSC1001, MAT1001	9
	第二學期 學院課程: CSC1002, DDA2001, MAT1002, PHY1001	10
第二修業學年	第一學期 學院課程: BIO1008, STA2001H 主修必修科目: CSC3100	6 3
	第二學期 主修必修科目: DDA3020, MAT3007, STA2002H	9
第三修業學年	第一學期 主修必修科目: STA4001 主修選修科目: 兩科	3 6
	第二學期 主修必修科目: DDA4002 主修選修科目: 兩科	3 6
第四修業學年	第一學期 主修選修科目: 三科	9
	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**

Course List

I. School Package

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
BIO1008	Chemistry and Life Sciences	化學與生命科學	3
CSC1001	Introduction to Computer Science: Programming Methodology	計算機科學導論：程式設計方法	3
CSC1002	Computational Laboratory	計算機實驗	1
DDA2001	Introduction to Data Science	數據科學基礎	3
MAT1001	Calculus I	微積分（一）	3
MAT1002	Calculus II	微積分（二）	3
MAT2041	Linear Algebra and Applications	線性代數與應用	3
PHY1001	Mechanics	力學	3
STA2001H*	Honours Probability and Statistics I	概率及統計榮譽課程（一）	3

II. Major required courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
CSC3100	Data Structures	數據結構	3
DDA3020	Machine Learning	機器學習	3
DDA4002	Stochastic Simulation	隨機模擬	3
MAT3007	Optimization	最優化	3
STA2002H*	Honours Probability and Statistics II	概率及統計榮譽課程（二）	3
STA4001	Stochastic Processes	隨機過程	3

III. Major Elective courses

Methodology and Theory Stream Courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
CSC3001	Discrete Mathematics	離散數學	3
DDA3003*	Visual Analytics	可視化分析	3
DDA3005	Numerical Methods	數值方法	3
DDA4010	Bayesian Statistics	貝葉斯統計	3
DDA4080	Capstone Project	畢業設計	3
DDA4210	Advanced Machine Learning	高等機器學習	3
DDA4230	Reinforcement Learning	強化學習	3
DDA4240	Data Privacy and Ethics	數據隱私和道德	3
DDA4250	Mathematical Introduction to Deep Learning	深度學習中的數學	3
DDA4320	Random Matrices and Their Applications	隨機矩陣及其應用	2
MAT2002	Ordinary Differential Equations	常微分方程	3
MAT2050	Mathematical Analysis	數學分析	3
MAT3220	Optimization II	最優化（二）	3

MAT3280	Probability Theory	概率論	3
STA3020	Statistical Inference	統計推斷	3
STA3005	Statistical Computing	統計計算	3

Finance and Economics Stream Courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
DDA4080	Capstone Project	畢業設計	3
ECO3121	Introductory Econometrics	計量經濟學導論	3
ECO3160	Game Theory and Business Strategy	博弈論與商業戰略	3
ECO3211	Quantitative Methods for Policy Evaluation	政策評估的計量方法	3
ECO4121	Intermediate Econometrics	中級計量經濟學	3
FIN3080	Investment Analysis and Portfolio Management	投資分析與投資組合管理	3
FMA4200	Financial Data Analysis	金融數據分析	3
FMA4800	Financial Computation	金融計算	3
STA4002	Multivariate Statistical Analysis	多元統計分析	3
STA4003	Time Series	時間序列	3
STA4020	Statistical Modelling in Financial Markets	金融市場的統計建模	3

Operations Management Stream Courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
DDA4080	Capstone Project	畢業設計	3
DDA4260	Networked Life	數據科學之應用：生活中的網絡	3
DMS2030	Operations Management	營運管理	3
DMS3210	Topics in Supply Chain Management	供應鏈管理熱點	3
DMS4010	Social Network Analysis and its Business Application	社交網絡分析及其商務應用	3
DMS4031	Supply Chain and Logistics	供應鏈與物流	3
ECO3160	Game Theory and Business Strategy	博弈論與商業戰略	3
MGT2020	Principles of Management	管理學原理	3
MGT4270	Current and Regional Issues in Supply Chain and Logistics Management	供應鏈與物流管理現代和區域性問題	3
MKT4220	Big Data Marketing	大數據營銷	3

Life Science Stream Courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
BIM2005	Computational Biology	計算生物學	3
BIM2006	The Merge of Information Technology and Biotechnology	IT 和 BT 的融合及在生命與健康科學中的應用	2
BIM3001	Bioinformatics	生物信息學	3
BIM3007	Computational Genomics & Proteomics	計算基因組學和蛋白質組學	3
BIM3009	Design and Analysis of Bioinformatics Algorithms	生物信息算法設計及分析	3
BIO3204	Genetic Engineering	基因工程學	3

BIO3213	Protein Structure Analysis and Proteomics	蛋白質結構分析和蛋白質組學	3
DDA4080	Capstone Project	畢業設計	3
STA4012	Statistical Genetics and Genomics	統計遺傳和基因組學	3

Computing Stream Courses

Course Code	Course Title (English)	Course Title (Chinese)	Unit(s)
CSC2003	Introduction to Java Programming	Java 程序設計導論	3
CSC3001	Discrete Mathematics	離散數學	3
CSC3002*	C/C++ Programming	C/C++程序設計	3
CSC3050	Computer Architecture	計算機體系結構	3
CSC3150	Operating System	操作系統	3
CSC3160	Fundamentals of Speech and Language Processing	語音與語言處理基礎	3
CSC3170	Database System	數據庫系統	3
CSC4001	Software Engineering	軟件工程	3
CSC4005	Parallel Programming	並行程序設計	3
CSC4010	Introduction to Theoretical Computer Science	理論計算機科學導論	3
CSC4120	Design and Analysis of Algorithms	算法設計及分析	3
CSC4140	Computer Graphics	計算機圖形學	3
CSC4150	Mobile Computing with Internet of Things	物聯網移動計算	3
CSC4160	Cloud Computing	雲端計算	3
CSC4170	Social Networks	社交網絡	3
DDA4080	Capstone Project	畢業設計	3
DDA4107	Practical High-Performance Computing	應用高性能計算	3
DDA4220	Deep Learning and Applications	深度學習與應用	3
DDA4310	Computational Imaging	計算成像	3
ERG3010	Data and Knowledge Management	數據與知識管理	3

* The course title of CSC3002 is Introduction to Computer Science: Programming Paradigms for students who study the course before 2022-23 Term 2. For students who study CSC3002 from 2022-23 term 2, the course title is C/C++ Programming.
在 2022-23 學年第二學期前修讀 CSC3002，科目名稱為「計算機科學導論：程序設計範式」。
在 2022-23 學年第二学期及以後修讀 CSC3002，科目名稱為「C/C++程序設計」。

* The course code of Visual Analytics is DDA2003 for students who study the course before 2023-24 term 2. For students who study Visual Analytics from 2023-24 term 2, the course code is DDA3003.
在 2023-24 學年第二學期之前修讀「可視化分析」，科目代碼為 DDA2003。在 2023-24 學年第二学期及以後修讀「可視化分析」，科目代碼為 DDA3003。

* The course code and title of STA2003 Probability is changed to STA2001H Honours Probability and Statistics I since 2024-25 term 1. For students who study this course before 2024-25 term 1, the course code and title are STA2003 Probability. For students who study this course from 2024-25 term 1, the course code and title are STA2001H Honours Probability and Statistics I.
自 2024-25 學年第一学期起，「STA2003 概率論基礎」的科目代碼及科目名稱更改為「STA2001H

概率及統計榮譽課程（一）」。在 2024-25 學年第一学期以前修讀本科目，其科目代碼及科目名稱為「STA2003 概率論基礎」。自 2024-25 學年第一学期及以後修讀本科目，其科目代碼及科目名稱為「STA2001H 概率及統計榮譽課程（一）」。

* The course code and title of STA2004 Mathematical Statistics is changed to STA2002H Honours Probability and Statistics II since 2024-25 term 1. For students who study this course before 2024-25 term 1, the course code and title are STA2004 Mathematical Statistics. For students who study this course from 2024-25 term 1, the course code and title are STA2002H Honours Probability and Statistics II.

自 2024-25 學年第一学期起，「STA2004 數理統計」的科目代碼及科目名稱更改為「STA2002H 概率及統計榮譽課程（二）」。在 2024-25 學年第一学期以前修讀本科目，其科目代碼及科目名稱為「STA2004 數理統計」。自 2024-25 學年第一学期及以後修讀本科目，其科目代碼及科目名稱為「STA2002H 概率及統計榮譽課程（二）」。