

College of Business

商學院

Department of Management Sciences

管理科學系



香港城市大學
City University of Hong Kong

Master of Science in Business and Data Analytics (Quantitative Analysis for Business Stream)

商業及數據分析理學碩士
(工商數量分析專修範疇)



Student Handbook

2022-2023

Department of Management Sciences

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Note :

- (1) Please read this programme handbook in conjunction with the academic policies and regulations in student e-portal and University Calendar. Should you need detailed advice on the MScBDA(QAB) programme, please feel free to email <MScBDA.QAB@cityu.edu.hk>.**

- (2) Details contained in this booklet are subject to changes. For updated information, please visit MScBDA(QAB) website https://www.cb.cityu.edu.hk/ms/mscbda_qab/.**

August 2022

1. Program Introduction

The MSc in Business and Data Analytics (MScBDA) program aims to cultivate students with professional knowledge of business data analytics through active learning of the statistical and analytical methods, real-world business examples, and programming techniques. The program curriculum includes a wide range of knowledge areas such as applied statistics, big data management, data mining, social media analytics, economic and financial forecasting.

The MScBDA program has three streams. Typically, a student will be admitted to either the Quantitative Analysis for Business (QAB) or the Information Analytics Management (IAM) streams. Under exceptional circumstances, a student may be considered for admission to the General(G) stream. For applicants interested in the QAB stream, please directly apply to the QAB stream through the application system.

The QAB program (Quantitative Analysis for Business), previously known as MScQAB or MAQAB, has a history of nearly 30 years. The current MScBDA (QAB) program has been developed to provide the modern quantitative skills that will facilitate business problem identification, analytical framework formulation, and statistical analysis in a wide range of areas in the finance industry, technology firms, and public sectors. Many of our graduates have held managerial positions in business and industrial sectors in Hong Kong. Recent graduate placements include many top companies in mainland China, including Tencent, ByteDance, Nielsen, Earnst and Young, Deloitte, Ping An Asset Management, etc.

The MScBDA (QAB) program offers comprehensive quantitative methods, including courses on applied regression analysis, data mining, predictive modeling in marketing, economic forecasting, and financial econometrics. The program benefits from training students through statistical programmings, such as SAS, R, and Python, and provides hands-on experience for data analytics. All our courses are self-contained and do not require previous programming experience from students. We teach students real-world business examples with relevant data analysis through hands-on programming exercises.

2. PROGRAMME STRUCTURE

- 2.1 Academic Year is a period of 12 months starting in August/September of each year. The Academic Year consists of two semesters (A and B), each of 13-week duration and a Summer Semester of 7-week duration.**
- 2.2 The programme is composed of “courses”. Each course is assigned a number of credit units (CU) - usually three units for a one-semester course.**
- 2.3 In this programme, particular courses are designated as “prerequisite” or “precursors”. A “prerequisite” is a requirement that must be fulfilled before a student can register in a particular course. A “precursor” is not a requirement, but students are advised to complete the corresponding precursors before registering in a course.**
- 2.4 Table 1 – “List of Courses” shows the titles of these 15 courses in the programme.**

Table 1: List of Courses

Pre-requisite(s)	Programme Core Courses Code & Title	Credit Units
-	IS5413(#) Database Management Systems	3
-	IS6335 Data Visualization	3
-	MS5217 Statistical Data Analysis	3
MS5217	MS6711(#) Data Mining	3
	<u>Stream Core Course Code & Title</u>	
MS5217	MS5218 Applied Linear Statistical Models	3
	<u>Elective Courses</u>	
	5 elective courses in which at least 4 courses must be selected from the following courses:	
-	MS5216 Decision Analytics	3
MS5313 or MS5216	MS5223 Project Management	3
-	MS5313 Managerial Decision Modeling	3
-	MS5318 Predictive Analytics with Excel and R	3
-	MS6211 Statistical Modelling in Risk Management	3
MS5218	MS6219(#) Predictive Modeling and Forecasting for Business	3
MS5218	MS6221(#) Predictive Modeling in Marketing	3
MS5218	MS6601 Statistical Modelling in Economics and Finance	3
-	MS6712 Contemporary Topics in Quantitative Analysis for Business	3
	CB Elective	

Key : (#) = CEF reimbursable course

3. **CREDIT TRANSFER**

A maximum of 6 credit units can be transferred to the programme. Applications for credit transfer for the work completed prior to entry to the University must be made in the first semester following the student's admission. **The application deadline is 26 August 2022.** Applications for credit transfer for outside work completed after admission to the University must be made immediately in the semester following attainment of the additional qualification. For information on the application procedures, please visit website <https://www.sgs.cityu.edu.hk/student/TPg/record/credittransfer>.

4. **PROGRAMME MANAGEMENT AND COMMUNICATION**

4.1 **Programme Committee**

Academic policy and decision making relating to the programme are the responsibilities of the Programme Committee which considers such matters as entry qualifications and admission policy, curriculum, teaching methods, assessment and examination regulations. The Committee is also responsible for the monitoring and evaluation of the effectiveness of the programme to ensure that the academic objectives of the programme are achieved.

4.2 **Communication Channels**

The following channels of communication between students and the department are available:

- (a) Students who are having academic difficulties with a course should speak directly to the instructor of that course.
- (b) A student wishing to discuss the organisation of the programme should speak to the Programme Leader.
- (c) Students are also represented in the Programme Committee.

4.3 **Programme Management**

		<u>Rm No</u>	<u>Tel No</u>	<u>Email</u>
		LAU-		@cityu.edu.hk
(a)	<u>Programme Leader</u> Dr Gavin Feng	7-276	3442 8346	gufeng
(b)	<u>General Enquiry</u> Ms L Y Chung	7-261	3442 8645	ms33725

APPENDIX A

DEPARTMENT OF MANAGEMENT SCIENCES

ACADEMIC STAFF LIST

	<u>Tel No</u>	<u>Email</u> <u>@cityu.edu.hk</u>	<u>Research Interests</u>
<u>Head</u>			
Prof Alan T K Wan	34427146	msawan	Model Averaging and Selection, Varying-Coefficient Semi-parametric Models, Missing and Censored Data, Quantile Regression
<u>Associate Head</u>			
Prof Biying Shou	34428360	biyishou	Operations and Supply Chain Management, Network Economics
<u>Chair Professors</u>			
Prof Frank Y H Chen	34428595	youhchen	Inventory Models, Machine Learning in Supply Chains, Emerging Issues in Supply Chains, Healthcare Management
Prof Pengfei Guo	34428672	penguo	Service Operations Management, Queueing Economics, Supply Chain and Inventory Management, Healthcare Policy and Operations Management
Prof Houmin Yan	34422881	houminyan	Risk Modeling and Analysis, Machine Learning and Algorithms, Stochastic Models, Supply Chain Management

	<u>Tel No</u>	<u>Email</u> @cityu.edu.hk	<u>Research Interests</u>
<u>Professors</u>			
Prof Stephen W H Shum	34428571	swhshum	Pricing and Revenue Management, Supply Chain Management, Consumer Behavior in Operations Management
Prof Kevin W Y Chiang	34428676	wchiang	Dynamic Pricing, E-Commerce/E-business Strategy, Marketing Science, Operations/ Marketing Interface, Supply Chain Management
Prof David Y Z Li	34427253	yanzhili	Decision Analytics for Marketing, Logistics and Supply Chain, Interface Research between Operations and Marketing
Prof Guangwu Liu	34428304	guanliu	Financial Engineering, Risk Management, Stochastic Simulation, Machine Learning, Business Analytics
Prof Ye Lu	34428656	yelu22	Operations Management, Revenue Management
<u>Associate Professors</u>			
Dr Gang Hao	34428403	msghao	Multiple Criteria Decision Making, Neural Networks, Logistics and Supply Chain Management, Fraud Management and Enterprise Risk Management
Dr William S W Chung	34427057	mswchung	Large-Scale Modeling, Decomposition Methods, Equilibrium Modeling in Energy Market and Transportation
Dr Bruce K F Lam	34428582	msblam	Discriminant Analysis, Multi-Criteria Decision Making, Linear Programming, Data Envelopment Analysis
Dr Carrie K Y Lin	34429485	mshlincky	Scheduling, Health Care Applications, Operations Planning, Optimization, Simulation

	<u>Tel No</u>	<u>Email</u> @cityu.edu.hk	<u>Research Interests</u>
Dr Zhankun Sun	34428650	zhanksun	Stochastic Modeling, Optimal Control, Healthcare Operations, Behaviors in Decision Making
Dr Geoffrey K F Tso	34428568	msgtso	Statistical Modelling, Survey Methods, Market Research
Dr Jianfu Wang	34428349	jf.wang	Service Operations, Gig Economy, Information Technology Operations, Queueing Economics
Dr Iris M H Yeung	34428566	msiris	Time Series Analysis, Multivariate Analysis
Dr Yimin Yu	34424781	yiminyu	Inventory Models, Emerging Supply Chain Strategies, The Interface of Operations Management and Marketing, Behavior Models
<u>Assistant Professors</u>			
Dr Zhi Chen	34428041	zchen96	Data-Driven Analytics, Analytics under Uncertainty, Cooperative Game Theory, Risk Management
Dr Chi Wing Chu	34428574	chiwchu	Survival Analysis, Quantile Regression, Semiparametric Inference, High Dimensional Testing
Dr Gavin Guan hao Feng	34428346	gufeng	Bayesian Statistics, Empirical Asset Pricing, Financial Technology, Machine Learning in Finance
Dr Jingyu He	34424753	jingyuhe	Bayesian Statistics, Machine Learning Algorithm, Quantitative Finance
Dr Hanwei Li	34428587	hanweili	Empirical Operations Management, Pricing & Revenue Management, Machine Learning, Platform Operations
Dr Menglong Li	34428578	mengloli	Inventory Management, Revenue Management, Data-Driven Decision Making, (Discrete) Convex Analysis

	<u>Tel No</u>	<u>Email</u> @cityu.edu.hk	<u>Research Interests</u>
Dr Venus H L Lo	34424686	venus.hl.lo	Assortment Optimization, Pricing Problems in Revenue Management
Dr Sammy H K Yuen	34428579	mshkyuen	Data Mining Applications, Survival Analysis
Dr Zhixin Zhou	34428248	zhixzhou	Random Tensor Theory, Minimax Theory of PCA, Experimental Design on Network Data, Information Retrieval, Neural Ranking, Generative Adversarial Network

Instructors

Dr Susanna M L Tam	34427483	susannat	Transportation Research, Marketing Research
Ms Sally O S Tsang	34428583	mssallyt	Operations Research

APPENDIX B

COURSE DESCRIPTION

Core Courses

IS5413 Database Management Systems

This course aims to introduce the basic concepts of database systems. It covers database models and languages for the physical design and implementation, and design methods for the conceptual and logical design of database applications.

IS6335 Data Visualization

The goal of this course is to learn how to use visualization tools for data interpretation under the business context. We will explore ways to organize and derive meaning from vast amounts of data, with interesting visual examples from different application areas. Students will learn concepts, methods, and applications of data visualization methods. Students will also learn visualization tools from GUI-based Tableau software to more advanced programmable visualization packages in R and Python. They will be guided in creating engaging and interactive visualizations, as well as experiencing virtual reality applications. Students will apply the concepts and skills to designing a final project.

MS5217 Statistical Data Analysis

This course covers fundamental statistical concepts and necessary computational tools in data analysis. The goal is to learn how to perform descriptive, analytical, and predictive data analysis based on the real-world problems. This course also serves as a quantitative foundation for elective courses in marketing, finance, economics, and more advanced data science courses.

MS5218 Applied Linear Statistical Models

The aims of this course are to introduce the statistical concepts and methodology of linear statistical models. The curriculum emphasizes the use of regression modeling and analysis of variance techniques in solving business problems. Develop students' analytic ability to integrate and apply the knowledge and quantitative skills, in particular linear statistical model methods, gained in the course to solve business problems. Provide students with the opportunity to develop their skills in presenting the findings of their own project.

MS6711 Data Mining

This course introduces students to a range of popular and practical data mining and machine learning algorithms relevant to business applications. Students are required to perform data analysis using the python programming language. Upon successful completion of this course, students will have acquired the core foundational knowledge in the field, and be well-prepared for a wide variety of careers in data-analytics.

Elective Courses

MS5216 Decision Analytics

This course aims to train students' skills in modelling and optimization that are essential in turning real-world business decision-making problems into mathematical models and developing solution methods using computer packages such as spreadsheets, R/Python. It serves as a foundation course for business analytics, and covers commonly used optimization methods in business applications, including linear programming, and nonlinear optimization. It also introduces application of the optimization methods to a wide range of problems, including statistical estimation, machine learning, and business decision making under uncertainty.

MS5223 Project Management

This course aims to introduce fundamental concepts of project management, with an emphasis on the trade-offs involved; provide students with the tools and methodologies developed to assist project managers; enable students to apply the concepts and tools of project management through assignments, project, and case studies.

MS5313 Managerial Decision Modeling

Serving as a foundation course for developing advanced analytical and planning skills, this course aims to sharpen students' ability to creatively design, formulate, and construct quantitative models for managerial decision problems. Specifically, this course is intended to provide students with the key concepts, knowledge, and tools to use data, analytical models and information technology to support practical managerial decision-making. Develop students' basic skills and hands-on experiences to uncover useful information and to analyse various business decision problems. Expose students to the practical cases of how quantitative modelling and analysis skills have generated significant business values and competitive advantages.

MS5318 Predictive Analytics with Excel and R

The aim of this course is to introduce the statistical concepts and methodologies that are often associated with making predictions with data. We begin with fundamental statistical analysis (e.g. inference, simple regression), then adds both breadth (e.g. logistic regression) and depth (e.g. model selection) to the use of regression to find the best prediction model for business forecasting. You will learn how to build predictive models with data sets in various structures (e.g. quantitative or categorical response/predictors). You will understand the trade-off between over-predicting versus under-predicting. You will practice utilizing the learned methods to solve data-based business decision problems (e.g. healthcare operations, fraud detection) through examples and case studies. R language

will be used to process data and generate prediction models. No prior statistical knowledge is required, and you do not need prior knowledge about Excel or R.

MS6211 Statistical Modelling in Risk Management

This course aims to prepare students with business knowledge of risk management with emphasis on operational risk management, credit risk management, and financial risk management; develop students' modelling and computing skills to create and evaluate credit scorecards.

MS6219 Predictive Modeling and Forecasting for Business

This course aims to introduce students to a range of forecasting techniques used in business and economics; develop a solid conceptual understanding of these techniques; enable students to appreciate the practical relevance of the techniques through case studies; acquaint students with the necessary computing knowledge to execute an analysis.

MS6221 Predictive Modeling in Marketing

The goal of the class is to provide a broad overview of modern data-driven marketing techniques. We will cover the main areas of marketing that require data-driven decisions — targeted promotions and advertisements, churn management, recommender systems, pricing, and demand prediction. The emphasis is on applied predictive modeling in Python, and how machine learning tools are employed in the data science industry. The prerequisites include one course in probability and statistics and one course in regression analysis. Students are expected to work at least 5 hours after every lecture.

MS6601 Statistical Modelling in Economics and Finance

The goal of the class is to introduce financial econometrics: the intersection of statistics and asset pricing. We will cover a wide range of topics, including linear and nonlinear time series, volatility modelling, multivariate time series, and factor models. Particularly, we will discuss how factor-based investing and machine learning are employed in the investment industry. The prerequisites include one course in probability and statistics, one course in regression analysis, and basic knowledge in time series models. Students are expected to work at least 5 hours after every lecture.

MS6712 Contemporary Topics in Quantitative Analysis for Business

This course aims to extend the knowledge of students in the use of quantitative analysis and to further develop students the practical skills of some advanced quantitative techniques for business decision problems.

APPENDIX C

Academic Calendar 2022/23

Week	S	M	T	W	T	F	S	Events	Public Holidays
	August, 2022								
		1	2	3	4	5	6		
	7	8	9	10	11	12	13		
	14	15	16	17	18	19	20		
	21	22	23	24	25	26	27		
WK.1	28	29	30	31				Semester A 2022/23 29 Aug – 26 Nov Teaching Period	
	September								
					1	2	3		
WK.2	4	5	6	7	8	9	10		
WK.3	11	12	13	14	15	16	17		12 The second day following Mid-Autumn Festival
WK.4	18	19	20	21	22	23	24		
WK.5	25	26	27	28	29	30			
	October								
							1		
WK.6	2	3	4	5	6	7	8	3 Graduation Date	1 National Day 4 Chung Yeung Festival
WK.7	9	10	11	12	13	14	15		
WK.8	16	17	18	19	20	21	22		
WK.9	23	24	25	26	27	28	29		
WK.10	30	31							
	November								
			1	2	3	4	5		
WK.11	6	7	8	9	10	11	12		
WK.12	13	14	15	16	17	18	19		
WK.13	20	21	22	23	24	25	26	26 Last Day of Teaching	
	27	28	29	30				28 Nov – 3 Dec Student Revision Period	
	December								
					1	2	3		
	4	5	6	7	8	9	10	5 – 17 Examination Period	
	11	12	13	14	15	16	17		
	18	19	20	21	22	23	24	19 Dec – 7 Jan Semester Break	
	25	26	27	28	29	30	31		26 1 st weekday after Christmas Day 27 2 nd weekday after Christmas Day
	January, 2023								
	1	2	3	4	5	6	7	Semester B 2022/23	
WK.1	8	9	10	11	12	13	14	9 Jan – 15 Apr Teaching Period	2 Day following First Day of January
WK.2	15	16	17	18	19	20	21	21 – 27 Lunar New Year Break	
	22	23	24	25	26	27	28		22 – 25 Lunar New Year Holidays
WK.3	29	30	31						
	February								
				1	2	3	4	1 Graduation Date	
WK.4	5	6	7	8	9	10	11		
WK.5	12	13	14	15	16	17	18		
WK.6	19	20	21	22	23	24	25		
WK.7	26	27	28						
	March								
				1	2	3	4		
WK.8	5	6	7	8	9	10	11		
WK.9	12	13	14	15	16	17	18		
WK.10	19	20	21	22	23	24	25		
WK.11	26	27	28	29	30	31			
	April								
							1		
WK.12	2	3	4	5	6	7	8		5 Ching Ming Festival
WK.13	9	10	11	12	13	14	15	15 Last Day of Teaching	7 Good Friday
	16	17	18	19	20	21	22	17 – 22 Student Revision Period	8 Day following Good Friday
	23	24	25	26	27	28	29	24 Apr – 8 May Examination Period	10 Easter Monday
	30								
	May								
		1	2	3	4	5	6		1 Labour Day
	7	8	9	10	11	12	13	9 May – 3 Jun Semester Break	
	14	15	16	17	18	19	20		
	21	22	23	24	25	26	27		26 Buddha's Birthday
	28	29	30	31					

Week	S	M	T	W	T	F	S	Events	Public Holidays
	June, 2023								
WK.1	4	5	6	7	8	9	10	1 Graduation Date	
WK.2	11	12	13	14	15	16	17	Summer Term 2023	
WK.3	18	19	20	21	22	23	24	5 Jun – 22 Jul Teaching Period	
WK.4	25	26	27	28	29	30			22 Tuen Ng Festival
	July								
WK.5	2	3	4	5	6	7	8		
WK.6	9	10	11	12	13	14	15		1 HK SAR Establishment Day
WK.7	16	17	18	19	20	21	22	22 Last Day of Teaching	
	23	24	25	26	27	28	29	24 – 29 Student Revision Period	
	30	31						31 Jul – 5 Aug Examination Period	
	August								
	6	7	8	9	10	11	12		
	13	14	15	16	17	18	19		
	20	21	22	23	24	25	26		
	27	28	29	30	31			7 Aug – 2 Sep Term Break	

Note : represents public holidays including all Sundays

Provisional Academic Calendar 2023/24

	<u>Start Date</u>	<u>End Date</u>
Semester A		
Teaching Period	4 September 2023	2 December 2023
Student Revision Period	4 December 2023	9 December 2023
Examination Period	11 December 2023	23 December 2023
Semester Break	25 December 2023	13 January 2024
Semester B		
Teaching Period	15 January 2024	20 April 2024
Student Revision Period	<i>(Lunar New Year holidays: 10 – 13 February 2024)</i>	
Examination Period	22 April 2024	27 April 2024
Semester Break	29 April 2024	13 May 2024
	14 May 2024	8 June 2024
Summer Term		
Teaching Period	11 June 2024	27 July 2024
Student Revision Period	29 July 2024	3 August 2024
Examination Period	5 August 2024	10 August 2024
Term Break	12 August 2024	31 August 2024

Provisional Academic Calendar 2024/25

	<u>Start Date</u>	<u>End Date</u>
Semester A		
Teaching Period	2 September 2024	30 November 2024
Student Revision Period	2 December 2024	7 December 2024
Examination Period	9 December 2024	21 December 2024
Semester Break	23 December 2024	11 January 2025
Semester B		
Teaching Period	13 January 2025	17 April 2025
Student Revision Period	<i>(Lunar New Year holidays: 29 – 31 January 2025)</i>	
Examination Period	22 April 2025	26 April 2025
Semester Break	28 April 2025	13 May 2025
	14 May 2025	7 June 2025
Summer Term		
Teaching Period	9 June 2025	26 July 2025
Student Revision Period	28 July 2025	2 August 2025
Examination Period	4 August 2025	9 August 2025
Term Break	11 August 2025	30 August 2025

