CityU
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

2023-2024

Department of Management Sciences

College of Business
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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 2023

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 two streams. Typically, a student will be admitted to either the Quantitative Analysis for Business (QAB) or the Information Analytics Management (IAM) streams. For applicants interested in the QAB steam, 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 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
	Stream Core Course Code & Title	
MS5217	MS5218 Applied Linear Statistical Models	3
	Elective Courses 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 before the start of the first semester according to the deadline set by the University. **The application deadline is 1 September 2023.** 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.cityu.edu.hk/sgs/student/tpg/records/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*

			Rm No LAU-	Tel No	Email @cityu.edu.hk
(a)	*Programme Leaders*	Prof Gavin Feng	7-239	34428346	gufeng
		Prof Lilun Du	7-252	34427212	lilundu
(b)	*General Enquiry*	Ms L Y Chung	7-261	34428645	ms33725

DEPARTMENT OF MANAGEMENT SCIENCES

ACADEMIC STAFF LIST

	Tel No	Email @cityu.edu.hk	Research Interests
Head			
Prof Alan T K Wan	**34427146**	**msawan**	**Model Averaging and Selection, Varying-Coefficient Semi-parametric Models, Missing and Censored Data, Quantile Regression**
Associate Head			
Prof Biying Shou	**34428360**	**biyishou**	**Operations and Supply Chain Management, Network Economics**
Chair Professors			
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**
Professors			
Prof Stephen W H Shum	**34428571**	**swhshum**	**Pricing and Revenue Management, Supply Chain Management, Consumer Behavior in Operations Management**

	Tel No	Email @cityu.edu.hk	Research Interests
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, Interface Research between Operations and Marketing, Logistics and Supply Chain**
Prof Guangwu Liu	**34428304**	**guanliu**	**Business Analytics, Financial Engineering, Machine Learning, Risk Management, Stochastic Simulation**
Prof Ye Lu	**34428656**	**yelu22**	**Operations Management, Operations Research**

Associate Professors

	Tel No	Email	Research Interests
Prof Gang Hao	**34428403**	**msghao**	**Multiple Criteria Decision Making, Neural Networks, Logistics and Supply Chain Management, Fraud Management and Enterprise Risk Management**
Prof William S W Chung	**34427057**	**mswchung**	**Large-Scale Modeling, Decomposition Methods, Equilibrium Modeling in Energy Market and Transportation**
Prof Lilun Du	**34427212**	**lilundu**	**Large-scale inference and operations research**
Prof Bruce K F Lam	**34428582**	**msblam**	**Data Envelopment Analysis, Discriminant Analysis, Multi-Criteria Decision Making, Linear Programming**
Prof Carrie K Y Lin	**34429485**	**mslincky**	**Capacity Planning, Health Care Application, Optimization, Scheduling, Simulation**
Prof Zhankun Sun	**34428650**	**zhanksun**	**Behaviors in Decision Making, Healthcare Operations, Stochastic Modeling, Optimal Control**

	Tel No	Email @cityu.edu.hk	Research Interests
Prof Geoffrey K F Tso	**34428568**	**msgtso**	**Market Research, Statistical Modelling, Survey Methods**
Prof Jianfu Wang	**34428349**	**jf.wang**	**Gig Economy, Information Technology Operations, Queueing Economics, Service Operations**
Prof Yimin Yu	**34424781**	**yiminyu**	**Behavior Models, Emerging Supply Chain Strategies, Inventory Models, The Interface of Operations Management and Marketing**

Assistant Professors

	Tel No	Email @cityu.edu.hk	Research Interests
Prof Chi Wing Chu	**34428574**	**chiwchu**	**High Dimensional Testing, Quantile Regression, Semiparametric Inference Survival Analysis**
Prof Baojun Dou	**34428589**	**baojudou**	**High Dimensional Time Series, Spatio-temporal Processes, Statistical Learning for Finance**
Prof Gavin Guanhao Feng	**34428346**	**gufeng**	**Bayesian Statistics, Empirical Asset Pricing, Machine Learning in Finance, Time-Varying Econometrics**
Prof Jingyu He	**34424753**	**jingyuhe**	**Bayesian Statistics, Machine Learning Algorithm, Quantitative Finance**
Prof Hanwei Li	**34428587**	**hanweili**	**Empirical Operations Management, Machine Learning, Platform Operations, Pricing & Revenue Management**
Prof Menglong Li	**34428578**	**mengloli**	**Data-Driven Decision Making, (Discrete) Convex Analysis, Inventory Management, Revenue Management**
Prof Venus H L Lo	**34424686**	**venus.hl.lo**	**Assortment Optimization, Pricing Problems in Revenue Management**
Prof Sammy H K Yuen	**34428579**	**mshkyuen**	**Data Mining Applications, Survival Analysis**

	Tel No	Email @cityu.edu.hk	Research Interests
Prof Zhixin Zhou	**34428248**	**zhixzhou**	**Experimental Design on Network Data, Generative Adversarial Network, Information Retrieval, Minimax Theory of PCA, Neural Ranking, Random Tensor Theory**

Instructors

Dr Susanna M L Tam	**34427483**	**susannat**	**Marketing Research, Transportation 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 the methods and tools for the conceptual and logical design of database applications, and relational database models and languages for the physical design and implementation of database systems.

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.

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.

Academic Calendar 2023/24

Week	S	M	T	W	T	F	S	Events	Public Holidays
	September, 2023								
						1	2	**Semester A 2023/24**	
WK.1	3	4	5	6	7	8	9	4 Sep – 2 Dec Teaching Period	
WK.2	10	11	12	13	14	15	16		
WK.3	17	18	19	20	21	22	23		
WK.4	24	25	26	27	28	29	30		30 Day following Mid-Autumn Festival
	October								
WK.5	1	2	3	4	5	6	7	3 Graduation Date	2 Day following National Day
WK.6	8	9	10	11	12	13	14		
WK.7	15	16	17	18	19	20	21		
WK.8	22	23	24	25	26	27	28		23 Chung Yeung Festival
WK.9	29	30	31						
	November								
				1	2	3	4		
WK.10	5	6	7	8	9	10	11		
WK.11	12	13	14	15	16	17	18		
WK.12	19	20	21	22	23	24	25		
WK.13	26	27	28	29	30				
	December								
						1	2	2 Last Day of Teaching	
	3	4	5	6	7	8	9	4 – 9 Student Revision Period	
	10	11	12	13	14	15	16	11 – 23 **Examination Period**	
	17	18	19	20	21	22	23		
	24	25	26	27	28	29	30	25 Dec – 13 Jan Semester Break	25 Christmas Day
	31								26 Day following Christmas Day
	January, 2024								
		1	2	3	4	5	6		1 First Day of January
	7	8	9	10	11	12	13	**Semester B 2023/24**	
WK.1	14	15	16	17	18	19	20	15 Jan – 20 Apr Teaching Period	
WK.2	21	22	23	24	25	26	27		
WK.3	28	29	30	31					
	February								
					1	2	3	1 Graduation Date	
WK.4	4	5	6	7	8	9	10	9 – 15 Lunar New Year Break	10 – 13 Lunar New Year Holidays
	11	12	13	14	15	16	17		
WK.5	18	19	20	21	22	23	24		
WK.6	25	26	27	28	29				
	March								
						1	2		
WK.7	3	4	5	6	7	8	9		
WK.8	10	11	12	13	14	15	16		
WK.9	17	18	19	20	21	22	23		
WK.10	24	25	26	27	28	29	30		29 Good Friday
WK.11	31								30 Day following Good Friday
	April								
		1	2	3	4	5	6		1 Easter Monday
WK.12	7	8	9	10	11	12	13		4 Ching Ming Festival
WK.13	14	15	16	17	18	19	20	20 Last Day of Teaching	
	21	22	23	24	25	26	27	22 – 27 Student Revision Period	
	28	29	30					29 Apr – 13 May **Examination Period**	
	May								
				1	2	3	4		1 Labour Day
	5	6	7	8	9	10	11		
	12	13	14	15	16	17	18	14 May – 8 Jun Semester Break	15 Buddha's Birthday
	19	20	21	22	23	24	25		
	26	27	28	29	30	31			

Week	S	M	T	W	T	F	S	Events	Public Holidays
	June, 2024								
							1		
	2	3	4	5	6	7	8	3 Graduation Date	10 Tuen Ng Festival
WK.1	9	10	11	12	13	14	15	**Summer Term 2024**	
WK.2	16	17	18	19	20	21	22	11 Jun – 27 Jul Teaching Period	
WK.3	23	24	25	26	27	28	29		
WK.4	30								
	July								
		1	2	3	4	5	6		1 HK SAR Establishment Day
WK.5	7	8	9	10	11	12	13		
WK.6	14	15	16	17	18	19	20		
WK.7	21	22	23	24	25	26	27	27 Last Day of Teaching	
	28	29	30	31				29 Jul – 3 Aug Student Revision Period	
	August								
					1	2	3		
	4	5	6	7	8	9	10	5 – 10 **Examination Period**	
	11	12	13	14	15	16	17	12 – 31 Term Break	
	18	19	20	21	22	23	24		
	25	26	27	28	29	30	31		

Note :   ▨ represents public holidays including all Sundays

Provisional Academic Calendar 2024/25

		Start Date		**End Date**	
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
		(Lunar New Year holidays: 29 – 31 January 2025)			
Student Revision Period		22	April 2025	26	April 2025
Examination Period		28	April 2025	13	May 2025
Semester Break		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

Provisional Academic Calendar 2025/26

		Start Date		**End Date**	
Semester A					
Teaching Period		1	September 2025	29	November 2025
Student Revision Period		1	December 2025	6	December 2025
Examination Period		8	December 2025	20	December 2025
Semester Break		22	December 2025	10	January 2026
Semester B					
Teaching Period		12	January 2026	18	April 2026
		(Lunar New Year holidays: 17 – 19 February 2026)			
Student Revision Period		20	April 2026	25	April 2026
Examination Period		27	April 2026	11	May 2026
Semester Break		12	May 2026	6	June 2026
Summer Term					
Teaching Period		8	June 2026	25	July 2026
Student Revision Period		27	July 2026	1	August 2026
Examination Period		3	August 2026	8	August 2026
Term Break		10	August 2026	29	August 2026