School of Business

Program of Big Data Management and Applications for International Students (2023)

I. Introduction

Big Data Management and Applications (BDMA) is an undergraduate program offered by the Department of Information Systems and Management Engineering. This program is developed against the backdrop of the era of big data, focusing on big data management and governance and applications of data analysis theories and methods in management. Areas of BDMA include Business Statistical Analysis, Business Intelligence.

Academic subject areas: Management Science and Engineering

Program code: 120108T

II. Objectives and Learning Outcomes

1. Objectives

The curriculum of this program is based on the standard set by the National Education Guidance Committee and refers to similar programs run by leading domestic and foreign higher educational institutions. The curriculum aims to

1) cultivate skills that allow students to adapt to a dynamic economy,

2) meet the demand for talent in Guangdong, Hong Kong, and the Macao Greater Bay Area,

3) train students in evidence-based management and systematic management thinking,

4) disseminate interdisciplinary knowledge from Economics, Management, Information Systems, and Management Engineering,

5) develop students' capabilities in theoretical and quantitative analysis,

6) provide students the opportunity to develop entrepreneurship skills, and

7) educate future management talents with professional ethics, modern management knowledge, and international perspectives.

2. Learning Outcomes

Graduates of this program are expected to satisfy requirements in the following three aspects.

1) Knowledge requirements: Master management science and engineering theories; be well informed about various information and engineering technologies; know the fundamentals of science, arts, humanities, and the interlinks among them; understand big data processing, analytic methods, and specialized management science for data management in e-commerce; be skilled in business data modeling and applying various technologies, methods and tools to decision analysis.

2) Capability requirements: Possess the ability to independently acquire and update relevant knowledge in management science and engineering; be competent in comprehensively applying professional knowledge to practice; be skilled at logical thinking and communication; have strong capabilities in organizational coordination; be proficient in applying foreign languages of the trade; be able to make comprehensive use of management science, information technology, and engineering methods to solve business problems; be innovative in applying big data management and application theories; be capable of conducting business analysis of big data and providing support for decision making.

3) Quality Requirements: Have sophisticated ideological and political views and positive outlook on life and values; have strong legal awareness, high sense of social responsibility, professional ethics, teamwork spirit and social adaptability; possess scientific spirit, compassion, and professionalism; have innovative spirit and entrepreneurial consciousness; have healthy psychology and physique.

III. Study Length, Degree, and Graduation Requirements

1. Study length: 4 years.

2. Degree conferred: Students who complete and meet the degree requirements of the undergraduate program will be awarded a bachelor's degree in Management

3. The minimum credit requirement for graduation: 153 credits. The specific requirements are as follows.

Module		**Category**	**Minimum Credit Requirement**
General Education Courses	Chinese Language and Culture Module	Chinese Language and Culture	16
	Arts and Physical Education Module	Physical Education	4
		Arts	2
	Competence Development Module	Computer Programming	3
		Writing	2
		Foreign Languages	14
	Humanities and Social Sciences Module	Humanities	6
		Social Sciences	
		Chinese Studies	2
	Mathematics and Natural Sciences Module	Mathematics	12
		Physics	10
		Chemistry	3
		Geoscience + Life Science	3
	GE to Majors Bridging Module	Introduction to Majors	2
Major Courses	Major Required Courses	Major Foundational Courses	24
		Major Core Courses	18
		Practice-based Courses (Undergraduate Thesis, Internships, Research Projects, etc.)	17
	Major Elective Courses	Major Elective Courses	15
Total			153
Note: please see the General Education Requirement for more details on Chinese Language and Culture Module, Arts and Physical Education Module, Competence Development Module（Foreign Languages & Writing）, Humanities and Social Sciences Module, and GE to Majors Bridging Module.			

IV. Course Requirements for the Mathematics and Natural Sciences Module and Computer Programming

Course Category	Course Code	Course Name	Credits	Terms	Prerequisite	Dept.
Mathematics	MA117	Calculus I	4	1 Fall	None	MATH
	MA127	Calculus II	4	1 Spring	Calculus I	MATH
	MA113	Linear Algebra	4	1 Spring & Fall	None	MATH
Physics	PHY105	College Physics I	4	1 Fall	None	PHY
	PHY106	College Physics II	4	1 Spring	College Physics I	PHY
	PHY104B	Experiments of Fundamental Physics	2	1-2 Spring & Fall	None	PHY
Chemistry	CH105	Chemistry: The Central Science	3	1-2 Spring & Fall	None	CHEM
Geoscience + Life Science	BIO102B	Introduction to Life Science	3	1-2 Spring & Fall	None	BIO
Computer Programming	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	3	1-2 Spring & Fall	None	CSE

Note:

1. For Mathematics Category, students can take Mathematical Analysis I and II as alternatives to Calculus I and II; Advanced Linear Algebra I as an alternative to Linear Algebra.
2. For Physics Category, students can take General Physics I and II as alternatives to College Physics I and II.
3. For Chemistry Category, students can take General Chemistry as an alternative to Chemistry: The Central Science.
4. For Geoscience + Life Science Category, students can take Principles of Biology or Introduction to Earth Sciences as an alternative to Introduction to Life Science.
5. For Computer Programming Category, students can choose any one of the four computer programming courses.
6. The above alternative courses are also applicable to "Prerequisites for Major Declaration".

V. Prerequisites for Major Declaration

Major Declaration Time	Course Code	Course Name	Prerequisite
Declare major at the end of the first academic year	MA117/ MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	Calculus I/ Mathematical Analysis I
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	None
	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	None
	Note: The students who had completed above two prerequisites can take the rest of prerequisites after declaring the major		
Declare major at the end of the second academic year	MA117/ MA101a	Calculus I/ Mathematical Analysis I	None
	MA127/ MA102a	Calculus II/ Mathematical Analysis II	Calculus I/ Mathematical Analysis I
	MA113/ MA107	Linear Algebra/ Advanced Linear Algebra I	None
	CS109/ CS110/ CS111/ CS112	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	None
	EBA106	Management	None

Note:

1. If the number of students entering a major at the end of the first academic year in the department is greater than or equal to the total number of the teaching-research faculty (PI)*2*60%, all majors in the department may implement the prerequisites for major declaration at the end of the second academic year.
2. If the number of students entering a major at the end of the first academic year in the department is less than the total number of the teaching-research faculty (PI)*2*60%, all majors in the department do not implement the prerequisites for major declaration at the end of the second academic year.
3. Suppose the number of students applying for a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), then the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).
4. For departments that do not implement prerequisites for major declaration at end of the second academic year, if the cumulative number of students applying for a major at the end of the second academic year and the number of students who have entered a major at the end of the first academic year exceeds four times the total number of the teaching-research faculty (PI), the department may select students according to predetermined rules. In principle, the rules set by the department shall examine the students' suitability for the major and not based on weighted GPA (Specific rules shall be set by the department and announced in advance).
5. Management (EBA106) introduce the basic knowledge of big data management and applications. 1+3 students are suggested to take this course after declaring the major; 2+2 students are suggested to take this course before declaring the major.

VI: Major Course Arrangement

Table 1: Major Required Courses

Program of Big Data Management and Applications for International

Course Category	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Major Foundational Courses	FIN201	Microeconomics	3		2-3 Spring & Fall	None	FIN
	FIN204	Macroeconomics	3		2-3 Spring & Fall	None	FIN
	MA212	Probability and Statistics	3		2 Fall	Calculus II	MATH
	MIS202	Marketing	3		2 Spring	None	ISME
	EBA203	Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	MIS204	Prescriptive Decision Analytics	3	1	2 Spring	None	ISME
	MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	MIS206	Business Data Structures and Algorithms	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	Total		24	4			
Major Core Courses	MIS300	Big Data Ecology and Storage Computing	3	1	3 Fall	Business Data Structures and Algorithms	ISME
	MIS303	Big Data Governance and Business Model	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
	EBA301	Data analysis and	3	1	3 Fall	Management	ISME

		Data Mining				Information System/ Data Management and Databases	
	MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data Mining and Business Applications	ISME
	MIS317	Data Statistics and Econometrics	3	1	3 Spring	Probability and Statistics	ISME
	MIS305	Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	ISME
	Total		18	6			
Practice-based Courses	MIS370	Internship	3	3	2 or 3 Summer	None	ISME
	MIS480	Science & Technology Innovation Projects	2	2	Any term after the first academic year	None	ISME
	MIS490	Thesis	12	12	4 Spring & Fall	None	ISME
	Total		17	17			
Total			59	27			

Note:
1. Data Structures and Algorithm Analysis（CS203) / Data Structures and Algorithm Analysis B（CS203B) is regarded as equivalent to Business Data Structures and Algorithms (MIS206).

Table 2: Major Elective Courses

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Course Track	Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
Data Analytics	MIS302	Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	ISME
	MIS310	Social Network Models and Applications	3	1	4 Fall	None	ISME
	MIS320	Mining of Network Data	3	1	3 Spring	Business Data Structures and Algorithms	ISME
	MIS400	Business Intelligence Capstone	3	1	4 Fall	Fundamentals and Methods of Deep Learning/ Probability and Statistics	ISME
Decision Analysis	MIS301	Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	ISME
	MIS404	Operations Management	3		3 Fall	Prescriptive Decision Analytics	ISME
	MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	Probability and Statistics/ Prescriptive Decision Analytics	ISME
	MIS408	Advanced Operations Research	3		3 Spring	None	ISME
Business Administration	MIS223	Social Media and Digital Marketing	3	1	2 Fall	None	ISME
	MIS401	Advanced Marketing	3	1	3 Spring	Marketing	ISME
	MIS411	Digital Marketing Analytics	3	1	4 Fall	None	ISME
Other Electives	MIS208	Behavioral and Experimental Economics	3	1	2 Spring	None	ISME
	MIS212	Business Negotiations	3	1	2 Spring	None	ISME
	MIS308	Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	ISME
	MIS312	Entrepreneurial Thinking and Management	3		3 Fall	None	ISME
	MIS321	Consumer Behavior	3		2 Fall	None	ISME
	MIS322	International Business	3		2 Fall	None	ISME
	MIS323	Marketing Research	3		2 Spring	None	ISME
	MIS331	Big Data In Finance	3	1	3 Spring	Probability and Statistics	ISME

	MIS332	Blockchain Essentials and Application	3		3 Fall	None	ISME
	MIS333	Blockchain Development and Practices	3	1	3 Spring	None	ISME
	MIS334	IT Project Management	3		3 Fall	None	ISME
	MIS335	Supply Chain Management	3		3 Spring	Probability and Statistics	ISME
	MIS403	Big Data and Cluster Project Management	3		3 Spring	None	ISME
	MIS405	Advanced E-commerce and Management	3		4 Spring	None	ISME
	MIS406	Judgment and Decision Making	3		4 Fall	None	ISME
	EBA207	Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
	EBA420	Management Frontiers and Practices I	3	1	4 Fall	None	ISME
	EBA421	Management Frontiers and Practices II	3	1	4 Spring	None	ISME
	FIN203	Financial Accounting	3		2 Fall	None	FIN
Total			90	17			

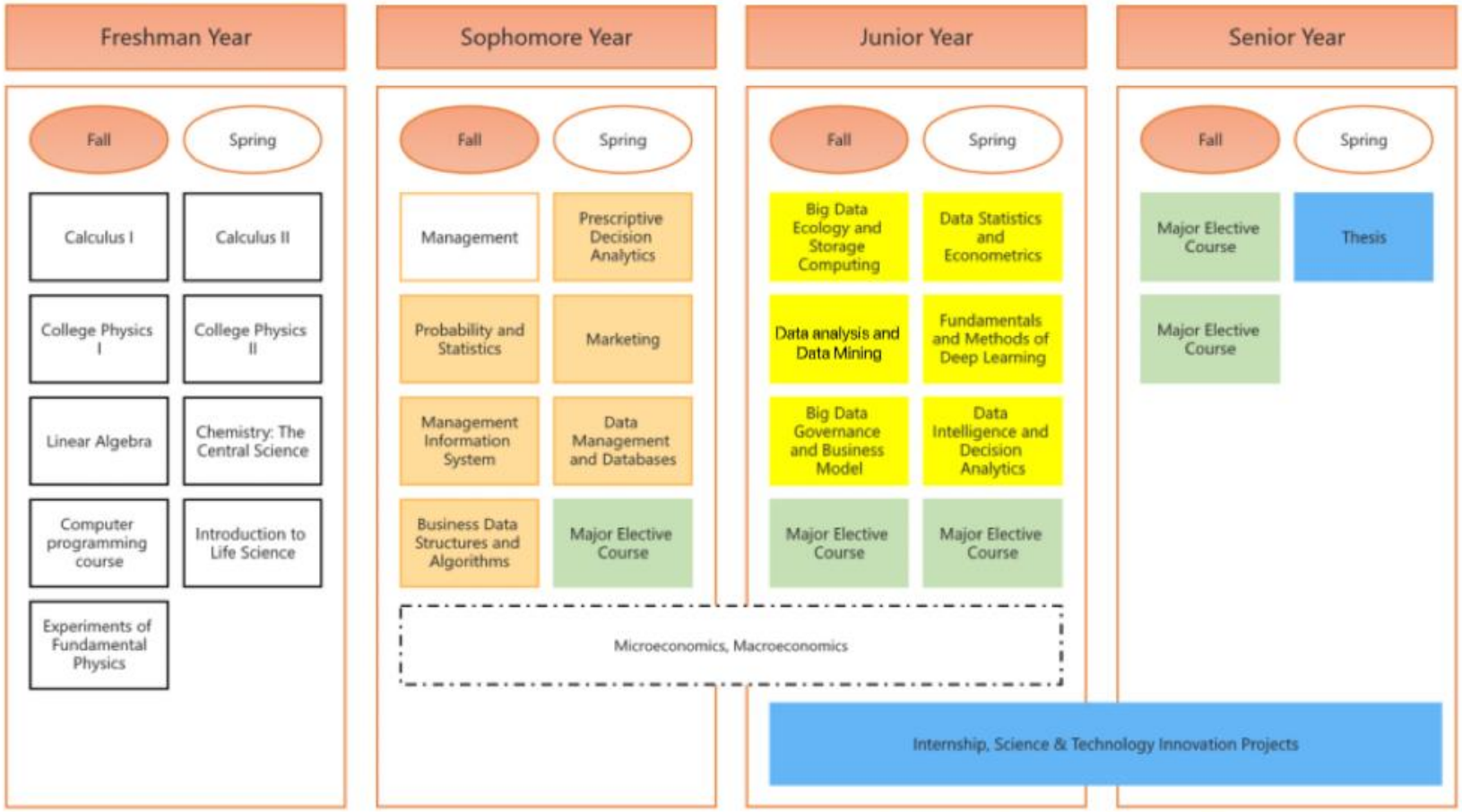
Note:

1. After declaring the major of Big Data Management and Applications, students need to choose at least one study track from Data Analytics, Decision Analysis, and Business Administration, and the student's academic advisor should sign for confirmation.
2. After determining the study track of major elective courses, student need to take at least two courses in this track (6 credits);
3. The requirement of total credits for major elective courses is 15 credits.
4. The term of taking the course is not compulsory, and can be adjusted according to student's own study plans.

Table 3: Overview of Practice-based Learning

Program of Big Data Management and Applications for International

Course Code	Course Name	Credits	Practice-based Learning Credits	Terms	Prerequisite	Dept.
CS110	Introduction to Java Programming	3	1	1-2 Spring & Fall	None	CSE
CS111	Introduction to C programming	3	1	1-2 Spring & Fall	None	CSE
CS112	Introduction to Python Programming Python	3	1	1-2 Spring & Fall	None	CSE
PHY104B	Experiments of Fundamental Physics	2	2	1-2 Spring & Fall	None	PHY
EBA203	Management Information System	3	1	2 Fall	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
MIS204	Prescriptive Decision Analytics	3	1	2 Spring	None	ISME
MIS205	Data Management and Databases	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
MIS206	Business Data Structures and Algorithms	3	1	2 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
MIS300	Big Data Ecology and Storage Computing	3	1	3 Fall	Business Data Structures and Algorithms	ISME
MIS303	Big Data Governance and Business Model	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
EBA301	Data analysis and Data Mining	3	1	3 Fall	Management Information System/ Data Management and Databases	ISME
MIS316	Fundamentals and Methods of Deep Learning	3	1	3 Spring	Data Mining and Business Applications	ISME
MIS317	Data Statistics and Econometrics	3	1	4 Fall	Probability and Statistics	ISME
MIS305	Data Intelligence and Decision Analytics	3	1	3 Spring	Probability and Statistics	ISME

MIS370	Internship	3	3	2 or 3 Summer	None	ISME
MIS480	Science & Technology Innovation Projects	2	2	Any term after the first academic year	None	ISME
MIS490	Thesis	12	12	4 Spring & Fall	None	ISME
MIS302	Big Data Management and ERP	3	1	4 Fall	Management Information System/ Data Management and Databases	ISME
MIS310	Social Media and Digital Marketing	3	1	4 Fall	None	ISME
MIS320	Mining of Network Data	3	1	3 Spring	Business Data Structures and Algorithms	ISME
MIS400	Business Intelligence Capstone	3	1	4 Fall	Fundamentals and Methods of Deep Learning/ Data Statistics and Econometrics	ISME
MIS301	Big Data Analysis and Application	3	1	3 Spring	Probability and Statistics	ISME
MIS407	Data Modeling and Analysis in Production Operations	3	1	3 Spring	Probability and Statistics/ Prescriptive Decision Analytics	ISME
MIS223	Social Media and Digital Marketing	3	1	2 Fall	None	ISME
MIS401	Advanced Marketing	3	1	3 Spring	Marketing	ISME
MIS411	Digital Marketing Analytics	3	1	4 Fall	None	ISME
MIS208	Behavioral and Experimental Economics	3	1	2 Spring	None	ISME
MIS212	Business Negotiations	3	1	2 Spring	None	ISME
MIS308	Empirical Methods in Economics and Management	3	1	4 Fall	Data Statistics and Econometrics	ISME
MIS331	Big Data In Finance	3	1	3 Spring	Probability and Statistics	ISME
MIS333	Blockchain Development and Practices	3	1	3 Spring	None	ISME
EBA207	Management System Analysis and Design	3	1	3 Spring	Introduction to Computer Programming/ Introduction to Java Programming/ Introduction to C programming/ Introduction to Python Programming	ISME
EBA420	Management Frontiers and Practices I	3	1	4 Fall	None	ISME
EBA421	Management Frontiers and Practices II	3	1	4 Spring	None	ISME
Total		102	44			

Curriculum Structure of Big Data Management and Applications