

**REGULATIONS FOR THE DEGREE OF  
MASTER OF SCIENCE IN BUSINESS ANALYTICS  
(MSc(BA))**

*These Regulations apply to candidates admitted to the Master of Science in Business Analytics curriculum in the academic year 2020-21 and thereafter.*

*(See also General Regulations and Regulations for Taught Postgraduate Curricula)*

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**Admission requirements**

**MSc(BA)1.** To be eligible for admission to the courses leading to the degree of Master of Science in Business Analytics, candidates shall

- (a) comply with the General Regulations;
  - (b) comply with the Regulations for Taught Postgraduate Curricula;
  - (c) hold
    - (i) a Bachelor's degree with honours of this University; *or*
    - (ii) another qualification of equivalent standard from this University or from another University or comparable institution accepted for this purpose; and
  - (d) satisfy the examiners in a qualifying examination, if required.
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**Qualifying examination**

**MSc(BA)2.**

- (a) A qualifying examination may be set to test the candidates' formal academic ability or their ability to follow the courses of study prescribed. It shall consist of one or more written papers or their equivalent, and may include a project report.
  - (b) Candidates who are required to satisfy the examiners in a qualifying examination shall not be permitted to register until they have satisfied the examiners in the examination.
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**Award of degree**

**MSc(BA)3.** To be eligible for the award of the degree of Master of Science in Business Analytics, candidates shall

- (a) comply with the General Regulations;
  - (b) comply with the Regulations for Taught Postgraduate Curricula; and
  - (c) complete the curriculum and satisfy the examiners in accordance with the regulations set out below.
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**Period of study**

**MSc(BA)4.** The curriculum shall normally extend over one academic year of full-time study. Candidates shall not be permitted to extend their studies beyond the maximum period of registration of two academic years.

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## Completion of curriculum

**MSc(BA)5.** To complete the curriculum, candidates shall

- (a) satisfy the requirements prescribed in TPG 6 of the Regulations for Taught Postgraduate Curricula;
  - (b) follow the courses of instruction and complete satisfactorily all prescribed written work and field work;
  - (c) satisfy the examiners in all prescribed courses as specified in the syllabuses and in any prescribed form of examination; and
  - (d) have achieved a cumulative GPA of 2.0 or above.
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## Assessment

**MSc(BA)6.** Candidates shall satisfy the examiners in all the prescribed courses as specified in the syllabuses. Examinations shall normally be held at the end of each course, unless otherwise specified. Only passed courses will earn credits.

**MSc(BA)7.** Candidates who have failed a course shall be required to sit for re-examination or to retake the course. If the failure is an elective course, candidates may elect to take another course as a substitute.

**MSc(BA)8.** Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held at some other time. Failure to sit for supplementary examination as arranged shall automatically result in course failure.

**MSc(BA)9.** Candidates shall not be permitted to repeat a course for which they have received a passing grade for the purpose of upgrading.

**MSc(BA)10.** Candidates who have failed a total of more than two examinations/assessments or re-examinations/re-assessments during the entire period of study of the curriculum shall be recommended for discontinuation under the provisions of General Regulations G12.

**MSc(BA)11.** There shall be no appeal against the results of examinations and all other forms of assessment.

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## Grading system

**MSc(BA)12.** Courses shall be graded according to the following grading system:

<i>Grade</i>	<i>Standard</i>	<i>Grade Point</i>
A+		4.3
A	Excellent	4.0
A-		3.7
B+		3.3
B	Good	3.0
B-		2.7
C+		2.3
C	Satisfactory	2.0
C-		1.7
D+		1.3
D	Pass	1.0
F	Fail	0

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**Assessment results**

**MSc(BA)13.** On successful completion of the curriculum, candidates who have shown exceptional merit at the completion of the curriculum may be awarded a mark of distinction, and this mark shall be recorded in the candidates' degree diploma.

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# **SYLLABUSES FOR THE DEGREE OF MASTER OF SCIENCE IN BUSINESS ANALYTICS (MSc(BA))**

*These syllabuses apply to candidates admitted to the Master of Science in Business Analytics in the academic year 2024-25 and thereafter.*

## **CURRICULUM STRUCTURE**

Candidates must read a total of ten courses, each carries 6 credits, comprising five core courses (inclusive of one capstone course) and five elective courses. Candidates may choose to concentrate in the Artificial Intelligence (AI) stream or the Management Consulting (MC) stream by fulfilling the required course requirements.

### **Core Courses (6 credits each):**

MSBA7001 Business Intelligence and analytics

MSBA7002 Business Statistics

MSBA7003 Decision Analytics

MSBA7004 Operations Analytics

### **Stream Elective Courses (6 credits each):**

Students who choose to concentrate in the AI stream are required to take a minimum of one course from elective List A and a minimum of one course from elective List B.

#### List A (AI Methods)

MSBA7013 Forecasting and Predictive Analytics

MSBA7021 Optimization and Reinforcement Learning

MSBA7027 Machine Learning

MSBA7028 Deep Learning

#### List B (AI Applications)

MSBA7026 Big Data Analytics on the Cloud

MSBA7032 Quantitative Trading

MSBA7033 Generative Artificial Intelligence

MSBA7035 Applied Large Language Models

MSBA7036 Ethics in Artificial Intelligence

Students who choose to concentrate in the MC stream are required to take a minimum of one course from elective List C and a minimum of one course from elective List D.

#### List C (Analytical Methods)

MSBA7014 Business Simulation

MSBA7023 Geospatial and Business Analytics

MSBA7024 Database Design and Management

MSBA7025 Digital Experimentation Methods

MSBA7027 Machine Learning

MSBA7029 Storytelling with Data

MSBA7037 A/B Testing in Product Management

#### List D (Domain Expertise)

MSBA7012 Social Media and Digital Marketing Analytics

MSBA7016 Supply Chain and Logistics Management

MSBA7017 Financial Engineering

MSBA7030 Digital Innovation

### **Capstone Course (6 credits):**

MSBA7005 Business Analytics Capstone

Candidates who do not choose to concentrate in any of the above streams can take any five elective

courses offered during the academic year. A list of electives will be announced at the beginning of each module. Candidates may also take up to two elective courses from the taught postgraduate curricula offered by the Faculty of Business and Economics under the advice and approval of the Programme Directors concerned.

Not all the courses listed in the syllabuses will necessarily be offered each academic year.

## **CURRICULUM STRUCTURE**

### **CORE COURSES**

#### **MSBA7001 Business Intelligence and Analytics (6 credits)**

Online transactions, mobile applications, Internet of things (IoT) devices, and social media generate massive amounts of data that is crucial for business operations and strategy. Accordingly, businesses increasingly need to know how to capture and analyse such data to gain managerial and strategic insights that will improve their competitive position. This course is fundamentally about where various sources of data come from; how to pull it and transform it; how to analyse it through basic data mining, data visualization, and basic analytics techniques; and how to gain original insights from such analyses. Hands-on technical skill development will strongly focus on using Python programming for data scrapping, data mining, and data analytics. Students will also learn the basics of Tableau for data visualization and reporting. This course will set the foundation for other courses in which the student will be expected to find, clean, and use original data, and where more advanced forms of analytics will be introduced.

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#### **MSBA7002 Business Statistics (6 credits)**

The discipline of statistics is concerned with situations involving uncertainty and variability. Variability greatly affects the interpretation of data. Thus statistics forms an important descriptive and analytical tool. This elementary course presents many standard situations of data analysis and interpretation with emphases on business examples. The statistical analyses of these situations are presented, through use of various statistical software.

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#### **MSBA7003 Decision Analytics (6 credits)**

This course introduces the basic concepts in quantitative business analysis to help you gain a clear understanding of the key elements in the decision making process. We discuss methods that are used extensively in business organizations. These methods provide you with the tools and the skills to approach, analyse, and solve problems of varying scales. Furthermore, this course aims at improving a decision-maker's overall problem solving ability by stressing approaches to 1) understand and question assumptions, 2) consider a richer set of solution alternatives, and 3) consider diverse measures of performance.

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#### **MSBA7004 Operations Analytics (6 credits)**

Operations are concerned with the management of the processes that convert inputs into outputs. Effective operations management involves managing people, equipment, and other resources. In the typical business organization, the majority of the costs and controllable assets are managed by the operations function. Thus, this discipline—with the techniques, procedures and knowledge it encompasses—is a vital segment of business activity. This course covers a set of techniques that were designed to help people understand operations processes and then improve processes whether those processes are administrative, manufacturing, product design, or service processes.

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#### **MSBA7005 Business Analytics Capstone (6 credits)**

This course allows students to integrate and apply the knowledge and techniques that they have learned in previous courses in a business analytics project. Teams of student will carry out business analytics projects using real-world data and have the opportunity to be involved in different stages in business analytics project, including project planning and management, strategy setting, model building, data analysis and interpretation, and result presentation. In the process students will become familiar with the use of analytics tools, quantitative techniques, and managerial skills in business analytics projects.

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## ELECTIVE COURSES

### **MSBA7011 Managing and Mining Big Data (6 credits)**

With vast amount of data being available, we are now in the era of “big data”. The knowledge and skills on large-scale data management are becoming increasingly important. This course provides a broad introduction to big data, including fundamental concepts and basic techniques for data acquisition and aggregation, state-of-the-art algorithms for data analysis, and technologies on modern computing platforms and systems for handling big data. The students will have extensive hands-on experiences applying these skills to solve practical problems.

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### **MSBA7012 Social Media and Digital Marketing Analytics (6 credits)**

Social media and digital advertising have become important sources for understanding the stakeholders of an organization, such as customers, suppliers, and pressure groups. Analysing data from these sources can reveal useful insights for strategic planning and achieving business objectives. This course is designed to help students develop strategies to create and extract value from these phenomena. Topics will cover strategic and operational issues pertaining to social media and digital marketing initiatives, metrics to capture and evaluate outcomes, and predictive analysis to link chatter to business performance. Techniques covered will include social network analytics, SEO/SEM, experimental design, text analytics, and sentiment analysis.

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### **MSBA7013 Forecasting and Predictive Analytics (6 credits)**

This course focuses on the fundamentals of forecasting and predictive models for business. This case-based, interactive course will analyse the applications of these models in various real-world business situations. Students will gain knowledge and hands-on experience in applying various statistical and data-mining techniques to make predictions by identifying patterns and making projections from historical data.

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### **MSBA7014 Business Simulation (6 credits)**

This course introduces simulation models to analyse business processes and solve practical problems. Students will gain basic knowledge such as Monte Carlo simulation and discrete event simulation first, and then be introduced to a simulation package that can be used to evaluate business process performance and, more importantly, facilitate decision making process.

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### **MSBA7015 Service Operations Management (6 credits)**

This course focuses on techniques to manage service operations and combine operations, marketing, and human resources aspects of services in the discussion. Topics will include (1) analyzing service process using queueing models, (2) improving service process with lean concepts, and (3) analyzing customer behavior data and improving service delivery.

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### **MSBA7016 Supply Chain and Logistics Management (6 credits)**

The course is designed to prepare students to apply business strategies, analytical methodologies and information technology in supply chain management. Traditionally industries have focused on operation evaluation and performance improvement of manufacturing process; however, the deficiency of supply chain coordination results in severe downgrade of business competitiveness. With advent of information technology, computers not only improve manufacturing operation and management, but also enhance strategic decision making as well. This course focuses on the systems approach to planning, analysis, design, development, and evaluation of supply chain management.

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### **MSBA7017 Financial Engineering (6 credits)**

The goal of this course is twofold. First, it aims to equip students with hands-on skills in using spreadsheet modeling and other analytical tools to solve investment and trading problems in finance. Excel

spreadsheet and VBA will be used as the primary tool of developing analytics, e.g., building term structure models, pricing options by simulation, etc. The other objective is to introduce Financial Technology (“FinTech”)—one of the most promising sectors in financial industry. FinTech start-ups capitalize on technological innovations to provide better financial services with enhanced efficiency. We will have an overview on the active product areas in FinTech, including digital wealth management, payment solutions, and capital-raising. Digital currency and the closely related technology (blockchain) will also be highlighted.

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**MSBA7018 Marketing Analytics (6 credits)**

This course focuses on introducing core principles of marketing and covering key marketing concepts such as managing customer relationships, analysing customers, competitors and marketplace, and developing marketing strategies (segmentation, innovation, and positioning) and marketing programs via various means such as mobile, emails, among others.

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**MSBA7019 Entrepreneurial Opportunities in Financial Technology (6 credits)**

The financial service sectors are experiencing unprecedented changes when they embrace novel technologies (e.g. big data analytics) and business models (e.g. p2p lending). This course aims to provide students with the essential knowledge and skills necessary for identifying business opportunities and developing new ventures in the emerging financial technology (Fintech) field. Emphasis is placed on how to identify and exploit business opportunities in a setting of rapid technological changes and a complex web of regulations and competitors. This course is ideal for students who anticipate founding Fintech ventures or are currently working for them.

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**MSBA7020 Accounting Analytics for Managerial Decisions (6 credits)**

This course offers an in-depth analysis of the internal management accounting systems and their use in firms’ decision-making, planning, and control. Major topics include the different methods of product costing, differential analysis for decision-making, cost allocation among divisions, design of planning and budgeting systems, and performance measurement issues. Some management control for multi-segment corporations will be discussed. Corporate ethics are also incorporated into the discussions.

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**MSBA7021 Optimization and Reinforcement Learning (6 credits)**

Modern business environment involves substantial uncertainty, and meanwhile generates vast amount of data. How can uncertainty be addressed properly and how can data be leveraged effectively in decision making? This course introduces modern optimization methodologies to facilitate decision making under uncertainty in a data-rich environment. Real-world examples will be presented to showcase that these key quantitative methods provide a significant competitive edge. Application areas include revenue management, digital advertising, online marketing, logistics, and finance.

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**MSBA7022 Analysis of High-Dimensional Data (6 credits)**

Data-intensive technology is generating unprecedented potential for modeling processes at fine granularity. The mathematical basis for this is called high-dimensional statistics. High-dimensional statistics deals with models and estimators that can take many parameters into account. In this course, we study such models and estimators from methodological and practical perspectives. We introduce statistical pipelines that range from the choice of an appropriate model and a corresponding estimator to the implementation in R and the interpretation of the outcomes.

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**MSBA7023 Geospatial and Business Analytics (6 credits)**

Location, concerning the “where” aspect of all businesses, is important everywhere: from long-tradition industries such as, agriculture, banking, real estate, utility services, to modern e-retailing, healthcare, and location-based service platforms like ride-sharing and urban deliveries. Thanks to the overwhelming growth of online purchasing, the penetration of smartphones and locate-aware apps, and the looming prospect of Internet-Of-Things, “every single new 21st century data source contains location (ESRI).” In such background, it is unsurprising that companies increasingly look for business

analysts with geospatial mindset and toolbox to unlock opportunities of growth and better customer services. This course introduces the students to the basic knowledge of geospatial data, system, methods, and helps them develop mindset and toolbox to tackle challenging business problems related to location.

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#### **MSBA7024 Database Design and Management (6 credits)**

The ability to store, retrieve, and manipulate data using modern database systems is essential to the success of business analytics projects. Besides relational databases that have been widely used in transactional systems and dimensional databases that have been the core of data warehouses, non-relational databases (often referred to as NoSQL databases) have also gained much popularity in business analytics because of their flexibility to handle semi-structured and unstructured data. This course aims to introduce the fundamental principles of the design, development, and administration of various database models for students with no prior experience and knowledge in database management. In this course, students will learn the basic concepts involved in the design and management of relational databases, dimensional databases, and NoSQL databases for business analytics.

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#### **MSBA7025 Digital Experimentation Methods (6 credits)**

The newly emerging capability to rapidly deploy and iterate online controlled experiments to assist decision makings in organizations is one of the most significant innovations in today's technology industry. As more and more social interactions, decisions, opinions, and transactions are mediated by online platforms, digital experiments are becoming increasingly crucial for firms to understand their user behaviors and make product decisions. This course will cover the most cutting-edge digital experimentation methods used in daily operations at large technology firms, such as Tencent, Alibaba, Facebook, and LinkedIn. We will also share the key lessons and pitfalls encountered in practice. Topics include the statistics behind experiments, experimental design, methods of analyzing experiments, networked experiments, quasi-experiments, A/B testing platform and culture in organizations, and recent development in digital experimentation. Students will also learn how to conduct and analyze online experiments using programming languages, such as python, in assignments and a course project.

*Note: This course is not open to candidates who have taken or are taking MSBA7037 or MSMK7034.*

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#### **MSBA7026 Big Data Analytics on the Cloud (6 credits)**

Big data capabilities become more essential to the success of a modern enterprise. Business analytics and data engineering practitioners are seeking to help organizations harness their large-scale data for actionable insights. That warrants a development of analytics capacity under scalable environment, such as Apache Spark and cloud computing. This course aims at introducing fundamental concepts of big data and developing analytics skills on big data. Students will learn relevant cloud computing services and big data technologies to design and implement analytics initiatives, ranging over machine learning, network analytics, and text mining, through realistic business cases.

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#### **MSBA7027 Machine Learning (6 credits)**

This course provides systematic training of machine learning, which is the foundation and core of data analytics. It covers various aspects from fundamental algorithms such as support vector machine to state-of-the-art topics such as gradient boosting, interpretability, and algorithmic bias.

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#### **MSBA7028 Deep Learning (6 credits)**

Deep learning being the core of artificial intelligence, has become more and more important. This course provides a broad introduction to deep learning, including fundamental concepts, state-of-the-art algorithms for data analysis, and their application to real cases.

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#### **MSBA7029 Storytelling with Data (6 credits)**

Storytelling with data is an essential skill in today's data-driven business world. This course demonstrates how to better understand your data, present clear evidence to your intended audience, and tell engaging data stories that highlight your business ideas visually and with logic. Through interactive



lectures, demonstrations, and case studies, students are expected to learn the best practices of making persuasive arguments, critical presentation design principles, and data visualization skills.

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**MSBA7030 Digital Innovation (6 credits)**

The course will focus on innovations in both analytics and technology-driven business models. The course contents will cover contemporary topics on innovation strategies, business analytics, platform economics, business model development, disruptive technologies, digital experiments, cryptocurrency, information privacy, etc. In particular, students will learn how to identify innovation opportunities and manage innovation processes. They will also be able to master the ability to develop digital business models.

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**MSBA7031 Blockchain Cybersecurity Risk Analytics (6 credits)**

This course is designed to provide students with a comprehensive understanding of the various forms of risks associated with the use of blockchain-based digital assets (with focus on cybersecurity) so that one may successfully manage, mitigate, or analyze these risks. Topics covered will include the technological elements of blockchains and smart contracts, cybersecurity and software engineering, case studies of blockchain and smart contract hacks, financial frauds and market manias, social coordination and engineering, risk modeling and analytics for Web3, InsurTech for Web3, and future opportunities for innovations in Web3.

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**MSBA7032 Quantitative Trading (6 credits)**

Quantitative Trading is an interdisciplinary subject involving a combination of techniques in statistical analysis, feature engineering, time series forecasting, machine learning and portfolio optimization. Through this course, students will get exposure to basic asset pricing for financial markets and how state-of-the-art quantitative techniques may be applied in real trading decisions.

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**MSBA7033 Generative Artificial Intelligence (6 credits)**

This course provides a comprehensive introduction to generative artificial intelligence (AI) and its applications in business contexts. Students will learn about the evolution and background of generative AI, in the context of decision-making, explore the various applications of generative AI in different business contexts, and examine the risks and opportunities associated with its use.

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**MSBA7034 International Study Field Trip (6 credits)**

This course is designed to provide students an opportunity to acquire first-hand knowledge of international business environment. Experiential learning and knowledge exchange will be applied throughout the study field trip to develop students' understanding of international business environment in a different cultural context and help them construct a global perspective. Firm visits and cultural related activities will be arranged during the study field trip to arouse students' awareness in cultural diversity and enhance their understanding of how culture can impact international business strategy.

*Note: This course is not open to candidates who have taken or are taking MACC7025, ECON6100, MFIN7057, PMGM7016 or MSMK7020.*

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**MSBA7035 Applied Large Language Models (6 credits)**

This Applied Large Language Models course offers students a comprehensive introduction to the latest advancements in LLMs, along with hands-on experience using state-of-the-art tools and techniques. Upon completing this course, students will be proficient in implementing LLMs across various applications, enhancing their professional skills and increasing their desirability in the job market.

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**MSBA7036 Ethics in Artificial Intelligence (6 credits)**

This course is designed to explore the ethical implications of AI technologies in real-world applications. Students will study the intersection of AI and ethics for social good, learning philosophical foundations, fairness, bias, civility in communication, misinformation, privacy, and green AI. Through hands-on

experience and assignments, students will develop skills in analyzing large-scale data sets, applying machine learning libraries, and building ethical AI systems.

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**MSBA7037 A/B Testing in Product Management (6 credits)**

This course offers an in-depth exploration of cutting-edge A/B testing techniques used in the daily operations of major technology firms, driving product innovation. We will also delve into key insights and common challenges encountered in practical scenarios. Topics covered include the statistical underpinnings of experiments, experimental design, methods for analyzing experimental data, the integration of A/B testing platforms and culture in organizations, recent advancements in A/B testing, and the principles of observational causal studies. Given the role of A/B testing as a pivotal tool in product management, this course emphasizes its application in this significant context. Participants will gain hands-on experience in conducting and analyzing online experiments using programming languages such as Python, complemented by assignments and an extensive course project.

*Note: This course is not open to candidates who have taken or are taking MSBA7025 or MSMK7034.*

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**MSBA7038 Professional Development Programme (6 credits)**

The course aims to provide students with practical knowledge and workplace skillsets shared by practitioners from various commercial and industrial sectors for the professional development and career advancement of students. Trending topics and current issues will be covered to equip students with the mindset and calibre for the challenges they are going to come across at workplace. With an emphasis on practice, the course instructors will deliver in-depth lectures on real world business issues.

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**MSBA7039 Independent Study Project (6 credits)**

This course offers a valuable opportunity for students to take ownership of their learning and produce an original and substantive piece of work. It allows them to tailor their studies to their individual interests and career aspirations. Students will produce a report or research paper on a topic of their choice on a specific business issue, industry or problem that they are particularly interested in. It gives them the opportunity to apply the skills and knowledge gained throughout the master's programme in a self-directed study project under the supervision of a faculty advisor.

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**ASSESSMENT**

Candidates shall be assessed for each of the courses for which they have registered, and assessment is normally conducted in the form of coursework assessment (50-100%) and examinations (0-50%), unless otherwise specified by the course instructor.