MASTER IN INFORMATION SYSTEMS
DATA SCIENCE TRACK

I. PROGRAM DESCRIPTION

The Master in Information Systems (MIS) is a graduate program intended to prepare students for strategic decision-making skills in the implementation of information systems in any organization. It is a program with a flexible curriculum that supports two unique professional path which is the Data Science Track and Health Analytics Track.

Data Science Track Specialization

This specialization provides technical and leadership training required for key positions in information technology, data science and analytics. It provides an understanding of how to work in professional roles in today's data-intensive and data-driven world. It reviews key technologies in analytics and business intelligence drawing from both traditional statistics and machine learning. The integration of data science and business strategy has created a demand for professionals who can make data-driven decisions that propel their organizations forward

II. COURSE DESCRIPTION

REMEDIAL COURSES

Course Name	**MIS001: Computer Programming in Data Analysis**
Course Description	This course introduces programming concept via utilizing the data science software to practice R programming. They will install and launch software and apply this industry relevant programming language to generate, manipulate, manage, and visualize health (or related) data. In this course students complete a variety of hands-on programming exercises to develop data science programming skills.
Number of Units	3 units

Course Name	**MIS002: Database Systems Design and Implementation**
Course Description	This course covers the fundamentals of database design and management. Topics include the principles and methodologies of database design, database application development, normalization, referential integrity, security, relational database models, and database languages. Principles are applied by performing written assignments and a project using an SQL database system.
Number of Units	3 units

IS CORE COURSES (12 Units)

Course Name	**MIS101: IS Organization, Management and Administration**
Course Description	This course introduces the key challenges and responsibilities of managing information systems and an information systems organization. Students gain knowledge of the various facets of managing information technology including how to develop an IT/IS strategy aligned with business strategy. Topics covered include the IT/IS solution lifecycle, IT/IS service management, IT/IS supplier management and sourcing, ongoing IT/IS technology operations, governance, business continuity, budgeting, benchmarking, and industry standard management frameworks.
Number of Units	3 units

Course Name	**MIS102: IT Project and Change Management**
Course Description	This course provides knowledge on the managerial and technical skills that are applicable to information systems software development lifecycle (SDLC) including requirements, analysis/design, implementation, and testing. The student applies the fundamental concepts and techniques of project management like schedule and budget estimation, resource allocation, progress monitoring, risk mitigation and contingency planning to IT projects in the software industry. It includes hands-on experience with traditional project management methodologies and modern project management methodologies like Agile project management. Standards for quality assurance and quality control, like ISO 9000 family of standards, will be discussed and explained to assess the maturity of the development organizations and the development processes for the IT projects. Business Communication and IT budgeting moves projects and innovation forward, focusing on application to real-world initiatives.
Number of Units	3 units

Course Name	**MIS103: Advanced Financial and Managerial Accounting**
Course Description	This course teaches students advanced theory and practice of contemporary accounting issues. The course deals with advanced financial accounting, inter-corporate investments, business combinations, financial statements, foreign currency translation, leases, pensions, and stock options. Advanced managerial accounting, accounting information systems, advanced costing models, activity-based costing, balanced scorecard, and economic value added (EVA) will also be studied.
Number of Units	3 units

Course Name	**MIS104: IS Policy and Strategy**
Course Description	This course introduces effective frameworks and methods for developing information technology and systems strategies that focus on meeting enterprises business objectives and on leveraging IT to competitively extend business capabilities. Topics covered include business driver identification and business and IT alignment; key technology components of the IT strategy, including enterprise architecture, enterprise systems, Service Oriented Architecture and other integration technologies, networks, and data management; portfolio management; sourcing and hosting alternatives; emerging technologies and entrepreneurship.
Number of Units	3 units

IS SPECIALIZATION COMMON COURSES (9 Units)

Course Name	**MIS105: Advanced Enterprise Data Management**
Course Description	This course explores enterprise data systems and sources, taking a holistic approach to knowledge management within organizations. This course will introduce enterprise and management-level information systems that support business processes including enterprise resource planning (ERP), decision support systems (DSS), supply chain management (SCM), knowledge management systems (KMS), customer relationship management (CRM), and human resources information systems (HRIS). Students will explore the impact of the Internet on traditional IT systems management with particular focus on the technical and policy impact personal smart devices and the unique security issues raised by mobile applications, social media, and cloud-

	based systems. The course will also introduce students to the fundamentals of logical data models and database design.
Number of Units	3 units

Course Name	**MIS106: Advanced Data Analysis and Visualization**
Course Description	Data analysis and visualization is an emerging field concerned with analyzing, modeling, and visualizing complex high dimensional data. This course will introduce state-of-the-art modeling, analysis and visualization techniques. It introduces students to design principles for creating meaningful displays of quantitative and qualitative data to facilitate managerial decision-making. It considers visualization as a component of systems for data science and presents examples of exploratory data analysis, visualizing time, networks, and maps. It reviews methods for static and interactive graphics and introduces tools for building web-browser-based presentations. It will emphasize practical challenges involving complex real-world data and include several case studies and hands-on work with the R/Python programming language, Rapid Miner, Weka and Tableau.
Number of Units	3 units

Course Name	**MIS 107: IS Research Methods**
Course Description	The course provides knowledge about dominant research methods and approaches in the field of Information Systems. It offers a discussion of the basics of scientific research in IS, the debate among the qualitative and the quantitative, a wide range of data collection methods and analysis, foundational research philosophies, design science research in IS, scientific quality and research ethics, and research writing. The aim of the course is to help students in selecting and using research methods and theoretical frameworks in the empirical research process. Knowledge developed in this course is therefore vital for the master capstone project. The course includes lectures, guest lectures by known IS scholars, interactive discussion seminars, and workshops. Activities are based on student group work during which involves student-led lectures and literature summaries as well as writing a final research proposal.
Number of Units	3 units

IS SPECIALIZATION (9 Units)

Course Name	**MISB 201: Advanced Business Analytics**
Course Description	This course combines the fields of management, business, and IT. The business aspect entails both a high-level understanding of the business as well as the practical limitations that exist. The analytical part involves an understanding of data, statistics and IT. This combination of fields allows business analysts to bridge the gap between management and technology. Business analytics utilizes big data, statistical analysis, and data visualization to implement organization changes. Prescriptive, Descriptive and Predictive analytics is an important aspect of this course as it involves available data to create statistical models. These models can be used to predict outcomes and inform decision making. By learning from existing data, students can make concrete recommendations to solve problems and improve businesses.
Number of Units	3 units

Course Name	**MISB 202: Advanced Data Science using Machine Learning**

Course Description	This course provides an overview of machine learning concepts, techniques, and tools with a practical emphasis on understanding large, complex datasets and building intelligent systems. Insights gleaned from data mining and machine learning can be used to optimize operational processes, identify new business opportunities, and support evidence-based decision making and digital marketing with applications in industries such as finance, retail, and healthcare. Students will develop skills to decompose a business problem into actionable tasks that include exploratory data analysis and visualization, data preprocessing and dimensionality reduction, algorithm selection, and model evaluation, optimization, and deployment. Supervised and unsupervised learning methods are introduced, and students will be exposed to a variety of machine learning algorithms which include regression, classification, regularization, decision trees, clustering, Bayesian, ensemble, dimensionality reduction, and neural networks. Students will explore data and learn from data, finding underlying patterns useful for data reduction, feature analysis, prediction, and classification.
Number of Units	3 units

Course Name	**MISB 203 Special Topics**
Course Description	This course is a variable course in Master in Information Systems in which students pursue topics or subjects of current interest that are not part of the regular curriculum. Topics of which will be selected by the Dean or Program Head
Number of Units	3 units

Prescribed course under Special Topics

MISB 203: IS Data Governance, Ethics, and Law

This course introduces data management concepts, including data quality, integrity, usability, consistency, and security. It considers the lineage of data, sometimes referred to as data provenance. It reviews ethical, legal, and technical issues relating to data acquisition and dissemination, as well as privacy protection. The course provides a management introduction to cybersecurity, including network, system, and database security, as well as encryption and blockchain technologies. The course covers laws relating to protecting intellectual property, with discussion of copyrights, patents, and contracts.

MISB 203: IS Analytics Entrepreneurship

This course prepares students to establish and run a technology-focused entrepreneurial organization. It identifies opportunities for technology products and services, including opportunities in data science, machine learning, and artificial intelligence. Students review methods of industry and market analysis to guide competitive strategy. They learn how to transform ideas into successful businesses, identifying the right data, information technology, and human resources, and aligning with unmet market demand. They learn how to deploy efficient operating models for independent and enterprise startups. They learn about growing a network of people and obtaining capital assets, creating innovative intellectual property, sharpening unique competitiveness, and making product development and marketing choices. Students develop business plans and make presentations for starting entrepreneurial ventures.

Course Name	**MIS 204: Capstone 1 IS Project Proposal**
Course Description	The capstone course focuses upon the practice of data science and health analytics. This course is the culmination of the MIS program. It gives students an opportunity to demonstrate their business strategic thinking, communication, and consulting skills. Business cases across various industries and application areas illustrate strategic advantages of analytics, as

	well as organizational issues in implementing systems for data science and health analytics. Students work in individually generating business plans and project implementation plans focusing on analytics and modelling. Students are expected to come up with a project proposal that needs to be approved by the adviser and the Faculty of MIS program before any subsequent work is started. Approval of proposal does not necessarily mean that the student's work already is an original contribution to knowledge. Any approval at this point means that the students' initial work shows innovative ideas and promise that may lead to that desired significant and original contribution.
Number of Units	3 units

Course Name	**MIS 205: Capstone 2 IS Project Implementation**
Course Description	The capstone course focuses upon the practice of data science and health analytics. This course is the culmination of the MIS program. It gives students an opportunity to demonstrate their business strategic thinking, communication, and consulting skills. Business cases across various industries and application areas illustrate strategic advantages of analytics, as well as organizational issues in implementing systems for data science and health analytics. Students work in individually generating business plans and project implementation plans focusing on analytics and modelling. This course is where refinements to the students' original idea are done and where the actual information systems development takes place. This is the other half of the entire course and therefore the amount of time, energy, and other resources students' need to get the job done is also roughly half the total amount of time required.
Number of Units	3 units