M.SC. BUSINESS ANALYTICS – RISK MANAGEMENT AND FINANCIAL ENGINEERING

Core Courses

BUSA 6000	Introduction to Business Analytics
BUSA 6001	Computer Simulation
BUSA 6002	Data Preparation and Visualization
BUSA 6004	Deep Learning
BUSA 6005	Database Design and Management
BUSA 6006	Digital Analytics
BUSA 6007	Data Mining – Supervised & Unsupervised Learning
LGSC 6003	Operations Research I
BUSA 6090	Consulting or Applied Project

RISK MANAGEMENT AND FINANCIAL ENGINEERING SPECIALISATION:

ACCT 6015	Equity and Fixed Income Securities
ACCT 6027	Portfolio Management & Wealth Planning
FINA 6100	Advanced Financial Engineering
FINA 6080	Risk Management of Financial Institutions
FINA 6005	Computational Finance

CORE COURSES

COURSE CODE: BUSA 6000
TITLE: Introduction to Business Analytics
CREDITS: 3

DESCRIPTION
This course introduces students to the field of business analytics, an area of business administration that considers the extensive use of data, methods, and fact-based management to support and improve decision making. It presents the fundamentals needed to understand the emerging role and value of business analytics in corporate environments. Using real-world case studies, students will develop skills in analysing business situations, and learn to identify and evaluate opportunities in which business analytics can be used to support the decision-making process and improve performance. Topics to be covered are inclusive of: the evolution of business analytics, descriptive analytics, predictive analytics, and prescriptive analytics.

COURSE CODE: BUSA 6001
TITLE: Computer Simulation
CREDITS: 3

DESCRIPTION
In this course, students will learn the fundamentals of computer simulation and how to build computer simulation models and use them to analyse management decision problems. They will be introduced to the theories and techniques of simulation. The main focus will be on discrete simulation events, although there will be some coverage of system dynamics. After completing this course, students will be able to develop a simulation model and run it using a simulation package or a spreadsheet.

COURSE CODE: BUSA 6002
TITLE: Data Preparation and Visualisation
CREDITS: 3

DESCRIPTION
Data gathering is often a tedious and arduous job. Once gathered, it typically includes mistakes, omissions, and inconsistencies that can significantly distort the results of data analysis. As a result, data preparation is an inevitable and vital step that needs to be carried out before analysing any large dataset. The goal of this course therefore is to introduce students to different tools and techniques designed for collecting data and preparing them for further analysis. The course will cover: obtaining data from the web, APIs, and databases in various formats, detecting errors in large datasets, and the basics of data cleaning. Additionally, it will develop students' data presentation skills. In particular, students will gain hands-on experience with a variety of visualization tools and techniques designed for transforming the results of performed data mining into a more meaningful and insightful visual representation.

COURSE CODE: BUSA 6004
TITLE: Deep Learning
CREDITS: 3

DESCRIPTION
This course examines the theoretical and practical deep learning techniques used in the analysis of large data sets. In this regard, students will not only be required to master deep learning theory, but also be able to apply in deep learning algorithms to real world problems. Students will practice all these ideas in Python and in TensorFlow. In addition, they will discuss case studies that involve Deep Learning for big data analytics. This course targets students who intend to pursue careers as data scientists work in the field of data analytics. Due to the data and technology intensive nature of the material, this course will be delivered primarily through face-to-face instruction and hands-on lab sessions. Finally, this class will culminate in an open-ended final project.

COURSE CODE: BUSA 6005
TITLE: Database Design and Management
CREDITS: 3

DESCRIPTION
This course introduces students to the major concepts, methodologies, tools and technologies that are required to analyse, design, develop and manage well-structured relational databases. In particular, students will also learn data modelling using entity-relationship diagrams. Furthermore, students will use database management systems (DBMS) to gain an appreciation of the concepts and practical applications of database management.

COURSE CODE: BUSA 6006
TITLE: Digital Analytics
CREDITS: 3

DESCRIPTION
This course is designed to develop students' conceptual and practical understanding of how to utilize digital data to drive business success. Specifically, it will expose students to an array of the most current digital analytics tools and methods as well as to the technical information necessary to: obtain and analyse digital data, turn data into insights and communicate insights into actionable recommendations. Upon successful completion of this course, students will be equipped with the skills necessary to implement digital analytics in an organizational context in order to support and achieve both strategic and tactical business objectives.

COURSE CODE: BUSA 6007
TITLE: Data Mining: Supervised and Unsupervised Learning
CREDITS: 3

DESCRIPTION
This course introduces students to the sophisticated methods and algorithms of supervised and unsupervised learning – two of the most important methodologies in data mining. It is designed to equip graduates with the knowledge and skills needed to understand, analyse, and derive insights from vast stores of digital information assets. Topics to be covered include: linear and logistic regression, support vector machines, neural networks, clustering, anomaly detection, dimensionality reduction, and recommender systems. At the end of the course students will not only possess an understanding of the fundamental concepts, principles, and techniques of supervised and unsupervised learning, but will also gain hands-on experience with major software tools and applications in the field and the practical know-how needed to effectively utilise the techniques learned to solve real- world data science

COURSE CODE: LGSC 6003
TITLE: Operations Research I
CREDITS: 3

DESCRIPTION
This course is concerned with the use of deterministic operations research models to solve decision problems. It introduces students to the operations research methodology and, through the use of simple cases, it illustrates how mathematical modelling can be used to improve decision making generally and, in particular, in logistics and supply chain management.

COURSE CODE: BUSA 6090
TITLE: Consulting or Applied Project
CREDITS: **6**

DESCRIPTION
This course provides students with an opportunity to conduct a real-world analytics projects using data from sponsoring organisations. It will challenge students to leverage the skills they have obtained throughout the program to address an analytics challenge, bringing together their theoretical learning with practical experience. With support from an appointed faculty advisor, students in this course will have the opportunity to draw on their skills in the areas of data preparation, data management, modelling, and statistical analysis to solve a real-world business analytic problem faced by an organisation in the business community. It should be noted that *students in the Capstone course may be required to sign non-disclosure agreements (NDAs) in order to have access to client data.*

RISK MANAGEMENT AND FINANCIAL ENGINEERING SPECIALISATION

COURSE CODE: ACCT 6015
TITLE: Equity and Fixed Income Securities
CREDITS: 3

DESCRIPTION:
This course aims to build on the concepts introduced in the Corporate Finance course and develops advanced concepts and tools that are useful for investors, issuers, traders and hedgers. In the area of Equities, students will be exposed to various valuation methods, financial statement analysis, technical analysis and portfolio management. In terms of Fixed-income securities, students will be exposed to the basic analytics of fixed-income securities, forward rates, term structure theories, immunization and understanding the effects of various embedded options.

COURSE CODE: ACCT 6027
TITLE: Portfolio Management & Wealth Planning
CREDITS: 3

DESCRIPTION:
This course is intended to be closely aligned with the CFA topic area Portfolio Management and Wealth Planning, and as such, its content is synonymous to what is covered in the CFA syllabus. Specifically, it covers topics such as portfolio risk management, asset allocation, performance evaluation, modern portfolio theory, trading and portfolio construction. Throughout this course, students are expected to develop an understanding of the key theoretical underpinnings of portfolio management and wealth planning and be able to apply these concepts to current industry practice. This course is also intended to address new developments in portfolio management and wealth planning and hence will provide students with opportunities to discuss current, relevant topics in the field.

COURSE CODE: FINA 6005
TITLE: Computational Finance
CREDITS: 3

DESCRIPTION:
Computational finance utilises mathematical, programming and statistical tools to solve problems encountered in finance. Financial institutions (e.g. investment banks, commercial banks and insurance companies) as well as regulatory agencies all utilise the tools of computational finance. Students will be introduced to the tools used in computational finance, which should help them to drive innovation and efficiency in their business or industry.

COURSE CODE: FINA 6080
TITLE: Risk Management of Financial Institutions
CREDITS: 3

DESCRIPTION:
This course introduces students to the financial services industry, which comprises deposit-taking banks, insurance companies, investment banks, pension and mutual funds. It examines the major risks of financial institutions management: interest rate risk, liquidity risk, market risk, operational risk, country/sovereign risk, foreign exchange and credit risk. The course presents quantitative methods used by financial institutions to measure and manage these risks and provides a critical analysis of specific topics and financial regulations: liquidity and capital requirements in banking, sovereign risk, debt sustainability, debt restructuring. The course is quantitative in nature

COURSE CODE: FINA 6100
TITLE: Advanced Financial Engineering
CREDITS: 3

DESCRIPTION:
Financial engineering utilizes mathematical and statistical methods to the problems encountered in finance. Financial institutions (e.g. investment banks, commercial banks and insurance companies) as well as regulatory agencies all utilize the tools of financial engineering. Students will be introduced to the tools used in financial engineering, which should help them to drive innovation and efficiency in their business or industry.

MANDATORY WORKSHOP

COURSE CODE: BUSA 6092
TITLE: Project and Consultancy Skills Workshop
CREDITS: Not-for-Credit

DESCRIPTION
This workshop is designed to prepare students for professional consulting work. During the workshop, students will learn about the nuances of consulting, ranging from: problem-identification, framing problems, analysing issues, and developing solutions. Additionally, students will develop their written and oral communications skills, as well as their presentation and stakeholder management skills. Altogether, students will develop proficiencies in a range of competencies that will enable them to successfully engage in consultancy work.