M.SC. BUSINESS ANALYTICS – AVIATION MANAGEMENT

CORE PROGRAMME

Core Courses

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

AVIATION MANAGEMENT SPECIALISATION:

AVMT 6100	Airport Operations Management
AVMT 6101	Information Systems (IS) and Business Analytics in Air Transportation
AVMT 6102	Introduction to the Air Transport Industry
AVMT 6103	Air Transport Operations Management
AVMT 6104	Risk Management for Air Transportation

COURSE DESCRIPTIONS

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 problems.

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: 3

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*

AVIATION MANAGEMENT SPECIALISATION

COURSE CODE: AVMT 6100
TITLE: Airport Operations Management
CREDITS: 3

DESCRIPTION:
This course examines topics such as airport design requirements, master plans and airport operations. Emphasis is also placed on the facilities that comprise an airport system including airspace, airfield, terminal and ground access operations. Furthermore, topics to be covered focus on a number of daily airport operational issues such as: managing annual budgets, fees determination methods, emergency planning, and relationships with airlines. Additionally, the curriculum focuses on other airport management operations such as: aircraft parking control, relationships with other industry bodies and general administrative tasks at airports such as flight information. More importantly, students will have an opportunity for a real-time immersion experience in an airport setting via the component of the course where students visit the local airport for a guided tour of its facilities and daily operations.

COURSE CODE: AVMT 6101
TITLE: Information Systems (IS) and Business Analytics in Air Transportation
CREDITS: 3

DESCRIPTION:
This course will focus on information systems and management within air transportation. Topics to be covered within information systems include: types of IS, strategic uses of IS, IS in the context of airlines, operational information systems, flight operations information interchange, etc. This course will also introduce students to the ways in which airline businesses leverage emerging technologies such as mobile computing, cloud infrastructure, data analytics, and artificial intelligence, to improve business performance.

COURSE CODE: AVMT 6102
TITLE: Introduction to the Air Transport Industry
CREDITS: 3

DESCRIPTION:
This course provides an introduction to the business environment in which air transport operates, and covers key operations and issues within air transport management. It will cover a host of topics including air transportation systems, air traffic management, the airport business, aviation economics as well as aviation safety and security.

COURSE CODE: AVMT 6103
TITLE: Air Transport Operations Management
CREDITS: 3

DESCRIPTION:
This course seeks to provide students with an overview of the operational aspects of air transportation including: airline operational strategies, airline fleet planning, airline economics and financing, flight scheduling, airline pricing and distribution, airline revenue management, fuel conservation, and its economic impact. It will also provide opportunities for students to apply their knowledge and skills to real-world ATM cases.

COURSE CODE: AVMT 6104
TITLE: Risk Management for Air Transportation
CREDITS: 3

DESCRIPTION
This course enables students to develop a comprehensive understanding of security measures and regulations in the aviation industry, including principles and practices of risk management in addressing aviation security. This course will also use examples and case studies to teach students how to apply risk management processes and assessment tools in an aviation context. Ultimately, this course will aid students in their abilities to assess, evaluate, mitigate and monitor risks within air transportation.

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.