

Annex 2 Prospectus

Department of Business Intelligence and Management

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Lecturers:	Henry Azzam, Lina Tannir, Rania Uwaydah Mardini, Mohamad Faour, Khaled Abdallah, Riad Dimechkie, Amr Yafawi, Karim El-Khatib, Nadine Sinno, Jad Jaber, Lama Halawani, Mahmoud Bizri, Sally Hammoud, Abeer Rawas, Elizabeth Kassab, Ohanness Kozobokian, Zeina Harfoush, Leila Khauli, Maher Itani, Ibrahim Kebbe, Elie Nasr, Rabih Badran, Mona Zoughaib, Rita Geutcherian, Yassar Nasser, Mosbah Mazjoub, Mosbah Mazjoub, Neveen Ahmad
Instructors:	Sana El Hajj, Abdeljalil Ghanem, Ali Charif, Antoine Wakim, Sylvain Massaad, Daoud Matta, Manal Khater, Rawiya Kaissi, Romy Saber, Bassem El Bawab, Mohamad Abdallah, Hagop Panossian, Michael Kfour, Walid El Khazen, Nadim Kabbara Jad Maalouf, Jihad Al Hokayem, Hanna Nasser, Yann Pavie, Khaled Abdelsamad, Ragheed Moughrabi, Ingrid Abi Antoun, Rima Akoum, Georges El Kazzi

The Department of Business Intelligence and Management offers an undergraduate degree program leading to a bachelor's degree in management (BBA) and a graduate degree program leading to a Master of Science in Business Analytics (MSBA).

Master in Business Analytics Program (MSBA)

Degree Requirements

For successful completion of the MSBA, students must complete all components of the program, which carry a total of 90 ECTS over 3 semesters, 30 ECTS each. The program consists of 6 Compulsory (Core), 3 electives plus an Applicative Thesis (also called Capstone) or 2 electives + Research Thesis

Purpose & Objectives

The Master's in Business Analytics program (MSBA) prepares students with knowledge, tools, and skills to analyze big data, to make effective business decisions, improve performance, create shared value, and enable the digital transformation from basic to smart organizations. Graduates of the program will learn the various data analytics processes from managing, modelling, analyzing, visualizing, and recommending solutions to challenges in various domains, including supply chain and operations, project management, marketing, human resources, and finance.

Program Objective Areas:

- *Data*- Identify technological frameworks for collecting, preparing, processing, analyzing, and delivering data.
- *Skills*- Develop advanced analytical modeling and problem-solving skills to best address challenges in various industries.
- *Reporting techniques*- Learn reporting techniques with emphasis on visual display of big data and analytical results.
- *Communications*- Learn how to effectively communicate analytical and complex results to different audiences.
- *Management skills*- Develop core management skills relevant to business analytics projects, including designing, planning, implementing, leading teams and managing conflicts.

Learning Outcomes

On successful completion of this program the graduate will be able to:

- Identify technological frameworks for collecting, preparing, processing, analyzing, and delivering data.
- Recognize the challenges of implementing business analytics solutions, including strategic alignment, planning, project management, team leadership, conflict resolution, negotiation, and convincing techniques.
- Clean data.
- Analyze data.
- Effectively communicate complex analytical results and insights to a mixed audience.
- Exhibit advanced analytical modeling and problem-solving skills to best address challenges in various industries.
- Exhibit core management skills relevant to business analytics projects, including designing, planning, implementing, leading teams and managing conflicts.
- Apply advanced analytical models and software tools to address various types of business analytics problems.
- Recommend appropriate analytics solutions to business problems, including defining business requirements, relevant data, needed information technology, competitive edge, and value added proposition to the business.
- Apply reporting techniques with emphasis on visual display of big data and analytical results.

Program Requirements

For successful completion of the MSBA, students must complete all components of the program, which carry a total of 90 ECTS over 3 semesters, 30 ECTS each.

The program consists of:

- 6 Compulsory (Core)
- 3 electives + Applicative Thesis (also called Capstone) or 2 electives + Research Thesis

The specific course requirements are as follows:

	Course Code	Course Title	ECTS
Semester 1			
1.	Core 1 - MSBA300	Business Understanding in Analytics	7.5
2.	Core 2 - MSBA305	Data Processing Framework	7.5
3.	Core 3 - MSBA310	Applied Statistical Analysis	7.5
4.	Core 4 - MSBA320	Optimization and Simulation	7.5
Semester 2			
5.	Core 5 - MSBA315	Data Visualization and Communication	7.5
6.	Core 6 - MSBA325	Predictive Analytics and Machine Learning	7.5
7.	Elective 1	Refer to list of offered electives	7.5
8.	Elective 2	Refer to list of offered electives	7.5
Semester 3			
9.	Elective 3	Refer to list of offered electives	6
10	Applicable Thesis Project (Capstone Project)		24
·	Or Research Thesis		30

List of proposed electives:

- MSBA 370- Data-Driven Digital Marketing
- MSBA 385- Healthcare Analytics
- MSBA 317- Forecasting Analytics
- MSBA 316- Text Analytics and Natural Language Processing
- MSBA 360- Social Media Analytics
- MSBA 350C- Big Data Processing and Block chain Technology
- BUSS 350D- Venture Acceleration Practicum
- DCSN 340- Supply Chain Management
- DCSN 310- Operations Management

Course Description

BUSS 350D Venture Acceleration Practicum

The student will learn about the lean startup approach to new product and new venture development process as well as associated business model concepts while getting

hands-on experience through the actual doing of new startup/venture idea acceleration. The structure of the course provides for current entrepreneurs to mentor you in action. The entrepreneurs understand that class participants may have skill gaps and a nascent understanding of the skills they need. Thus, providing invaluable tips, tricks and traps of entrepreneurship as well as know-how.

DCSN 310 Operations Management

This course gives an overview of the strategic and tactical decisions involved in operating a production or service system for sustainable competitive advantage. Emphasis is on the core concepts of capacity, variability and quality. Topics include: evaluating process capacity; estimating and reducing labor costs; batching and flow interruptions; waiting-time problems and throughput losses; quality management, statistical process control and six-sigma capability; and lean operations. Links among operations, finance and strategic success are explored.

DCSN 340 Supply Chain Management

This course addresses supply chain management as a source of competitive advantage. It covers procurement, logistics, inventory management, warehousing, network design, and information communication in the context of the supply chain. Emphasis is placed on improving the performance of the supply chain through coordination strategies and use of analytical tools. Case studies and discussion of current developments form an integral part of the course.

MSBA 300 Business Understanding in Analytics

This course will focus on the business understanding and problem framing. This includes analysis of previous findings; identifying stakeholders' challenges and organization ecosystem; understanding innovation essentials and components of analytics framework to compete on analytics; developing a data strategy for defining key performance metrics, data quality checks,, benchmarking indices; and data sources; introducing big data concepts and technological infrastructure for processing information; discussing innovative business models, appropriate analytical tools and necessary leadership role to implement analytics initiatives and prioritize them for budgeting; efficient resource allocation, effective creation of shared values and sustainable performance growth in a business domain. First, the course will establish that business analytics is a distinct but related to analytics in general and that the distinction is the focus of the overall course as well as the whole MSBA program. Second, this courses will familiarize the students with key notions in business, e.g., strategy, operations, and marketing vis-à-vis business analytics. Third, the students will be introduced to a framework of how to devise analytics solutions to business problems. Fourth, the course will demonstrate how analytics can be applied and improve business situations through specific industry and company cases.

MSBA 305 Data Processing Framework

The course focuses on the technology processing of data prior to performing data analytics to extract actionable intelligent insights. It covers data preparation, integration and processing using open-source software tools such as Python, Hadoop and Spark based platforms. Topics include identification of the datasets of interest; preparing the data;

building data models using SQL and NoSQL databases and performing operations to explore large and complex datasets. It also explores big data and how and when to integrate big data platforms within an enterprise information system. Through guided hands-on tutorials, students will become familiar with data processing techniques using different frameworks.

MSBA 310 Applied Statistical Analysis

This course is designed to familiarize students with various applied statistical methods and tests. It will enable students to gain statistical knowledge and skills needed to solve business problems. In addition to the overview of hypothesis testing methods and exploratory data analysis (EDA), the course covers in-depth a wide range of parametric and non-parametric regression models such as multiple linear regression with interaction terms, multicollinearity diagnostics, variable selection, logistic regression, and classification and regression trees (CART). Students will already have received an early hands-on training as part of the pre-requisite Bootcamp on using the statistical tools and packages required for this course such as R/R-Studio, Python, Excel, and SPSS.

MSBA 315 Predictive Analytics & Machine Learning

Students in this course will learn about supervised and unsupervised training methods. The focus is on identifying relationships that cannot be found by basic statistics and used for example in customer satisfaction, branding, machine failure, resource allocation, fraud detection, and fraudulent activities. Techniques include Nearest Neighbors, Naive Bayes, deep learning, text mining, clustering, association rules, regularization and dimensionality reduction. The bias/variance trade-off and model selection is a focal point of the course and will be illustrated from multiple angles. Students will acquire hands-on experience on all techniques taught. (Prerequisites: Python)

MSBA 316 Text Analytics and Natural Language Processing

This course focuses on the computational aspect of Natural Language Processing (NLP) technologies and aims at finding a balance between traditional and modern NLP techniques. It covers major concepts and techniques for processing, cleaning, visualizing, and analyzing textual data to extract interesting information, discover knowledge, and support decision-making in business applications. Students will learn fundamental pre-processing techniques (i.e., tokenization, stemming, lemmatization, part-of-speech tagging, and named entity recognition), text representation (i.e., vector-space and language models, and modern distributed representation of words), and various text analytics tasks (i.e., text categorization and classification, document summarization, and sentiment analysis). Hands-on labs and projects in parallel to course lectures and readings will allow students to develop practical skills in building foundational NLP tools that can be applied to address real-world business analytics problems. (Prerequisites: Knowledge of Python)

MSBA 317 Forecasting Analytics

Time series forecasting is essential for every organization that deals with quantifiable data. It is widely used in retail stores, international financial organizations, energy companies, banks and lending institutions, and in many other industries. Forecasting analytics enable managers and policy makers to better make informed decisions. This course is a hands-

on introduction to quantitative forecasting of time series. Students will learn the most popular forecasting techniques used in practice. The course covers topics such as pre-processing, characterization, and visualizing time series, model performance evaluation, smoothing methods, time series regression models, Box-Jenkins models, autoregressive integrated moving average (ARIMA) models, models with binary outcome, and neural networks for time series (if time permits). (Prerequisites: MSBA310)

MSBA 320 Optimization & Simulation

This course is an introduction to quantitative models for managerial decisions making in a complex and dynamic business environment. Students learn to develop linear, discrete, non-linear, and multi-criteria optimization models, perform sensitivity analysis, develop constraint programming models, analyze decisions under uncertainty, and conduct scenario analysis using simulation. The course introduces students to some advanced software tools used in optimization and simulation.

MSBA 325 Data Visualization & Communication

This course introduces students to the latest data visualization techniques and tools to visualize data using dashboards, scorecards, and other formats. Students will learn presentation techniques with emphasis placed on the data story, the visual display of data and smart reporting of results. Students will acquire hands-on skills to create effective presentations leveraging latest technology and software such as Tableau, QlikView, or IBM Insights. Other covered topics include web analytics and communication.

MSBA350-C Big Data Processing and Block chain Technology

This course is an extension to MSBA305 – Data Processing Frameworks and has two pillars. The course first focuses on block chain technology and its applications in business. It explores how block chain brings profound changes to businesses and explains how it transforms businesses structures, functions and roles of the organization. The course then dives into the various methods of block chain governance that exist in the market place and examines specific features of block chain to overcome problems that have been difficult to solve in the past using the existing centralized architecture. Topics include: key concepts like hashing, public key cryptography, digital signing, mining, proof-of-work, proof of stake, public vs private vs permissioned block chain, peer-to-peer transactions, blocks, consensus mechanisms, smart contracts, crypto-asset, distributed resources, decentralized protocol, and the double spending problem. These concepts will be illustrated using the Bitcoin application and implemented mainly using Ethereum. The course then tackles how to process large data volumes on large computational clusters by introducing advanced features for Spark 2.0. Students will learn how to set up clusters in both batch and real time modes, retrieve big volumes of textual data, analyze streaming data and use the ML API. (Prerequisites: MSBA305, MSBA315)

MSBA 360 Social Media Analytics

This course addresses the move towards social media to build intellectual capital, communicate with society, exchange knowledge among a global workforce, and provide the public face of business for marketing and corporate communications. The course explores the role of social media technologies (e.g., Twitter) in shaping societal and

business trends, and emphasizes analyzing social media data in terms of reach, engagement, influencers, etc. using Python and open source tools. The course also explores social networks in the important of information propagation in social media. (Prerequisites: Bootcamp Python, MSBA305, MSBA310)

MSBA 370 Data-Driven Digital Marketing

Digital marketing in the era of fast-browsing, redundancy of choices and lack of time has quickly evolved into a challenging science of perception, with data as its core driver. This course covers the key concepts and strategies of data-driven digital marketing and growth hacking with real-world applications and case studies. The aim is to demystify the role of data in providing critical marketing insights that can pave and shape marketing strategies. Students will examine the various techniques for search engine optimization and will learn how to implement and manage search-advertising campaigns. They will also learn how to effectively engage with customers across a diverse range of social media platforms and experience the best practices for creating and delivering effective e-mail and mobile marketing campaigns. The course utilizes relevant theory, empirical analysis, and practical examples to develop the key learning points. (Prerequisites: Bootcamp-knowledge of R and Python, MSBA305, MSBA310)

MSBA 385 Healthcare Analytics

The rise of preventive care, health technology and telemedicine has generated massive amounts of multidimensional health data. The magnitude and complexity of these data are overwhelming for healthcare providers and stakeholders to analyze and extract meaningful knowledge to make informed decisions. Moreover, the COVID 19 pandemic has unveiled profound weaknesses in the healthcare systems of most countries. Global investments in private health systems and private healthcare solutions have witnessed a 6% increase in Q2 2020 and are predicted to increase significantly in the future. Students will be equipped with the knowledge to work in the healthcare field or with a healthcare client as analyst or consultant. You will be introduced to the pillars of healthcare systems and the main health concepts and measures. You will learn about healthcare data types and sources, how to formulate data queries, how to use geospatial information systems to map health data and how analytics is applied in the healthcare field. Finally, you will dive into the economic evaluation and financial impact of health-related interventions and programs. (Prerequisites: MSBA315)