Master of Science in Business Analytics (MSBA) - Coursework

2022 / 2023

Descriptive Analytics
Data Aggregation
Summarization Visualization

Data-Driven Business Decisions & Strategies

Predictive Analytics
Forecasting Predictive Modeling

Prescriptive Analytics
Decision Modeling

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BACKGROUND

The rise of modern information technologies has turned data into an asset helping businesses make effective decisions, and insightful strategies. It essentially demands an integrated approach requiring knowledge in business, statistics, computer science, mathematics, and operations research. This has given rise to the interdisciplinary Business Analytics (BA) field, which is already witnessing a global multi-billion-dollar market via new positions including data analysts; artificial intelligence, machine learning, and big data specialists; and analytics & optimization strategists. The Saudi local analytics job market is responding to this global trend, which is predicted to consistently grow in the foreseeable future.

ABOUT THE PROGRAM

At the College of Business Administration, we offer Master of Science in Business Analytics **(MSBA)** by **Coursework**, designed for various job market orientations and career objectives. It covers full BA-stack (Descriptive, Predictive and Prescriptive Analytics) and has unique features including high flexibility and application focus, allowing participants to work on functional domains of their choice, such as energy, supply chain, marketing, or healthcare analytics. The program has been designed and benchmarked against top analytics programs around the world.

PROGRAM OBJECTIVES

The MSBA by Coursework program prepares students for a successful business analytics career. This program:

1- Prepares its graduates to employ modern data science and operational research tools and techniques to solve and lead challenging data-driven business problems.

2- Equips students with the necessary technical skills in business analysis & planning via descriptive, predictive, and prescriptive analytics.

PROGRAM LEARNING OUTCOMES

MSBA-Coursework graduates are expected to:

1. Demonstrate the ability to critically analyze, frame, and manage complex business problems.
2. Exhibit programming, mathematics, and statistics skills necessary in solving business analytics problems.
3. Manage large and/or distributed business datasets.
4. Employ descriptive, predictive, and prescriptive analytics tools and techniques in business analysis and planning.

DEGREE OFFERED

Master of Science in Business Analytics by Coursework (MSBA-Coursework)

JOB MARKET

The graduates from the MSBA-Coursework program are suitable for the following job positions:

1. Business Analyst/Business Analytics Specialist/Business Analytics Consultant
2. Business Intelligence Analyst
3. Data Scientist/Data Analyst
4. Predictive Research & Analytics Consultant
5. Predictive Analytics Manager/Expert
6. Analytics & Optimization Strategist
7. AI Specialist/Machine Learning Specialist
8. Big Data Specialist

PROGRAM DURATION & STRUCTURE

The MSBA-Coursework program structure is summarized below**:**

Components	Credit Hours
Core Courses	25
Elective-1 (technical)	3
Elective-2 (business)	3
Total Credit Hours	31

Table 1: MSBA-Coursework Program Summary

The program uses the following two-year study plan:

YEAR 1								
Term-1		**Hrs**	**Term – 2**		**Hrs**	**Term – 3**		**Hrs**
MIS-601	Business Analysis & Planning	3	MIS-603	Math and Stats for Analytics	3	MIS-605	Data Analysis & Learning	3
MIS-602	Programming for Analytics	3	MIS-604	Data Management & Visualization	3	MIS-606	Decision Making and Optimization	3
YEAR 2								
Term – 4		**Hrs**	**Term – 5**		**Hrs**	**Term – 6**		**Hrs**
MIS-640	Analytics in Industry	3		Elective-II (business)	3	MIS-698	Capstone Project	3
	Elective-I (Technical)	3	MIS-695	Proposal Seminar	1			

Table 2 : MSBA-Coursework Study Plan

In the above plan, the program starts with three background courses in Business Analysis & Planning, Programming, and mathematics and statistics. The next three courses in the first year are related to the *three BA components* via MIS-604, MIS-605, and MIS-606 courses. In the fourth term, the students take their technical elective alongside the *Analytics in Industry* course, which allows students to have a unique analytics application focus on the business domain of their choice. The final component of the program includes a proposal seminar and an applied capstone project. The list of elective courses is provided below:

Elective-I (technical) Courses					
Code	**Course Tile**	**LT**	**Lab**	**CR**	**Pre. Req.**
MIS-610	Queuing & Simulation Modeling	4	0	3	MIS-603
MIS-611	Time Series Analysis	4	0	3	MIS-603
MIS-612	Big Data Analytics	4	0	3	MIS-602 & 604
MGMT-654	Operations & Supply Chain Management	4	0	3	
MIS-617	Special Topics in Analytics	4	0	3	MIS-601/602
Elective-II (business) Courses					
Code	**Course Tile**	**LT**	**Lab**	**CR**	**Pre. Req.**
MGMT642	Project Management	4	0	3	
MIS-614	Digital Transformation	4	0	3	MIS-601
MGMT-681	Strategic Management	4	0	3	

Table 3: List of Electives

FEE STRUCTURE

Total tuition fee of the program is 84,000 SAR. This fee is divided over the 2-year academic period.

TARGET STUDENTS AND ADMISSION REQUIREMENTS

The program is suitable for:

1. Business graduates
2. Computer science graduates
3. Engineering graduates
4. Mathematics & statistics graduates

The general admission requirements of the program are in line with the admission requirements of the Saudi unified regulations of graduate studies. In addition to the general requirements, students must fulfill the following:

1. The IAU graduate studies requirements
2. Holds minimum a bachelor's degree
3. Have a minimum GPA of 3.75 out of 5 or above (or equivalent)
4. Passing college's interview
5. Minimum English language requirements must meet one of the following:
    o TOEFL (internet-based testing): 55
    o IELTS: 5.5
    o Waved for universities with English programs

MIS-601 Business Analysis & Planning

This course aims at building competency in critical analysis, identification and framing of Business Analytics (BA) problems. It covers introduction to BA problems, a systematic planning of BA projects via formal problem statements; stakeholder identification; value propositions (via business value assessment tools); data and technical requirements; conceptual modeling; and appropriate solution schemes. Relevant business leadership, organizational change frameworks & perspectives will also be discussed. Formal business analysis and business proposal writing will be covered. Case studies will be used to demonstrate how each planning aspect is dealt with in real world. Being the first course in the program, the course also presents a general introduction to the field of business analytics and what value it brings to modern businesses. At the end, students are expected to produce and defend a formal BA proposal.

MIS-602 Programming for Data Analytics

Basic computer programming skills are required to employ tools/techniques used in Analytics. This course introduces a general-purpose high-level programming language (i.e., Python) that supports common analytics libraries. The course will cover programming basics; control and data structures; and basic algorithms. Some key data management libraries used in the advanced courses will also be introduced. The course is highly practical and conducted in a lab environment.

MIS-603 Math and Stats for Analytics

This is an analytics math background course covering topics in Probability & Statistics; Linear Algebra; and Calculus. Special focus will be on descriptive and inferential methods as well as basic regression modeling. Basic matrix algebra, differential and integral calculus will also be covered.

MIS-604 Data Management & Visualization

Based on MIS-603 background, this course advances the knowledge in data management and visualization. It includes techniques used in data acquisition, integration, preparation, exploration, analysis, and advanced visualization. The course discusses the role of data management and visualization in effective and informed business decision making, Accordingly, case studies with real data will be analyzed and visualized. **Pre-requisite:** MIS-602

MIS-605 Data Analysis & Learning

This course provides exposure to a broad spectrum of data analysis and predictive modeling techniques. The course is divided into two segments. The fist deals with data analysis via spreadsheets. It includes data handling and manipulation (e.g., lookup, index-match, pivot and PowerPivot & data filtering); advanced functions (logical, text, date, statistical & financial functions); What if analysis & forecast. The latter focuses on statistical learning including unsupervised learning (e.g. clustering); and, supervised learning (e.g. classification, neural networks). It also discusses model performance and deployment issues. Case studies will be evaluated to see its business applications.
Pre-requisites: MIS-602 & MIS-603

MIS-606 Decision Making and Optimization

This course focuses on optimization approach to solving real-world decision problems. It mainly focuses on building student skills to develop simple to medium-scale linear, integer, and mixed integer programming models. Common special structured problems such as network models, shortest-path problem, transportation, and assignment problems will be studied. While basic solution methods will be discussed, emphasis will be on students solving optimization models using commercial solvers (e.g., **Gurobi or CPLEX**). Additional topics include sensitivity analysis, decision under uncertainty, and dealing with non-linearity. **Pre-requisite:** MIS-603

MIS-610 Queuing & Simulation Modeling

This course covers analysis of stochastic business systems. It has two main parts. The first part introduces the basic queuing theory including exponential models, queuing networks, M/G/1 systems, and multi-server queues. In the second part, discrete event simulation will be covered. The topics include conceptual modeling; data requirements and gathering techniques; simulation modeling using a simulation software (i.e., **Arena Simulation Software**); and model validation & verification. The students are expected to perform one complete simulation study for a real business problem.
Pre-requisite: MIS-603

MIS-611 Time Series Analysis

This course focuses on statistical modeling of time series for accurate prediction leading to effective decision making. The course equips students with concepts and tools to deal with business time series data. The topics include time series basics, multiple regression, forecasting models, smoothing techniques, time series decomposition, error measures, and basic stochastics models. The course will extensively employ **R** throughout the course, where students are required to develop forecasting models using large real-world datasets. **Pre-requisite:** MIS-603

MIS-612 Big Data Analytics

The course first introduces the business aspects of big data analytics. This includes a discussion on market dynamics as well as key managerial issues (i.e., organizational alignment, integration strategies and data governance issues). It further analyzes the big data application high-performance aspects related to architectural choices in software and hardware. The last part covers an introductory technical discussion on tools and algorithms used in big data analytics. Emphasis is given on Spark 2.0 framework (via Python – PySpark) through real case applications related to Data exploration, regression, k-means, neural networks etc.
Pre-requisites: MIS-602 & MIS-604

MGMT-654   Project Management

The course introduces the area of project management to students. This course aims to build skills in students to manage challenging BA projects. It covers essentials of project management including project classification, social complexity in projects, project manager's roles and responsibilities during project life cycle. It also covers topics including conflict management, negotiation, budgeting, scheduling, resource allocation and monitoring & control.

MIS-614 Digital Transformation

The course introduces the core concepts related to digital transformation and digital business models. It discusses key digital technologies and architectures besides their role in forming new innovative business models. It specifically focuses on strategies that help capture business values via data-driven initiatives. **Pre-requisite:** MIS-601

MGMT-654 Operations & Supply Chain Management

The course first introduces key operations management topics, including new product development, process design, demand forecasting, inventory and logistics management, lean operations, capacity planning, scheduling, and Quality management. The course will also discuss basic supply chain mechanisms and strategies and how various operations drive supply chain management.
Pre-requisite: MIS-601

MGMT-681 Strategic Management

This course is designed to explore core concepts in strategic business management. It enables candidates to understand the systematic structures, models, and techniques behind successful business activities. Strategic Management draws mainly from the fields of Psychology, Business, and Management. The course exposes candidates to foundational theories, conceptual frameworks, methodologies, and business strategies to form a comprehensive understanding of the knowledge domain. Based on the premise that management skills can be learned, candidates will examine various theoretical constructs as a means of becoming more aware of their own leadership styles and apply strategic business models to improve organizational competitiveness. Candidates will identify and apply strategic models to analyze business problems, formulate strategic solutions, and make sound decisions. **Pre-requisite:** MIS-601

MIS-617 Special Topics in Analytics

This course mainly aims to offer students with the state-of-the-art knowledge of Business Analytics approaches, tool, and techniques. **Pre-requisite:** MIS-601 & 602
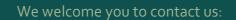
MIS-640 Analytics in Industry

This course has two parts. In the first part, models, and approaches from selected functional domains such as operations, supply chain management, marketing, healthcare, and energy will be covered. Analytics initiatives in relation to technologies including ERP, IoT and Blockchain will also be discussed. In the second part, students will be asked to perform a directed self-study involving an extensive academic literature review within the functional domain of their interest. The aim is to let students find a suitable problem and solution approach for their project work. The students are expected to write a report with a focus on the problems addressed, models used, and solution approaches employed. **Pre-requisite:** MIS-602

MIS-695 Proposal Seminar

In this course, each student will present a written proposal based on the program, i.e., MIS-698: Capstone Project. The proposed problem can be from any functional domain; however, it must have a substantial business relevance challenge. The proposal must include formal business case, a literature review and the proposed modeling and solution approach. The proposals will be approved by the project supervisor.

MIS-698 Capstone Project

The student will work on a project problem motivated by a significant industry problem, as proposed in MIS-695 under the direction of the supervisor. The project will be defended in a defense seminar in front of the supervisor.

We welcome you to contact us:

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