RIPHAH INTERNATIONALUNIVERSITY

ISLAMABAD

MS- BUSINESS ANALYTICS
FACULTY OF MANAGEMENT SCIENCES
RIPHAH SCHOOL OF LEADERSHIP

Riphah International University

Faculty of Management Sciences
Riphah School of Leadership
Master of Science in Business Analytics

The MS-Business Analytics program aims to develop problem solving skills among the students through an in-depth understanding of business analytics. This program develops unique skills in the students to analyze, synthesize and visually present data related to numerous fields of management sciences i.e., marketing, management, HR, operations and finance. The graduates of the MS-BA program will be equipped with in-demand skills and knowledge required for success in their professional careers. The program is a designed in a way that students with no background in business studies may also take admission in this program.

The program comprises of 36 credit hours and is based on two streams. Research Thesis Stream requires the student to complete 10 Courses of 30-credit hours and one Research Thesis 6-credit hours. Course Work Stream requires the student to complete 10 Courses of 3 credit hours each and 2 additional courses of 3 credit hours in lieu of thesis. The minimum time duration to earn MS Business Analytics degree by either stream is 1.5 years. The maximum duration to complete this degree is 4 years.

Program Objectives:

The key objectives of the proposed MS-BA program are:

a) To provide the students a well-structured academic program that can fulfil dynamic industry needs.

b) To provide the students a conducive environment where they can learn the state of the art technologies to become valuable analytics professionals.

c) To enable the students to understand the ethical values while dealing with the private and sensitive data sets.

d) To enable the students to understand the current issues and challenges in analytics and to identify new areas and solutions to enhance the business productivity of the industry.

Program Learning Outcomes:

The key learning outcomes of the MS BA program are to enable our graduates:

a) To demonstrate enhanced understanding of statistical and non-statistical methodologies including regression analysis, cluster analysis, non-linear models, text analysis and prescriptive and predictive modelling, and develop skills to visually present data

b) To have expertise in using various statistical software packages e.g., R, STATA, Python and SPSS.

c) To exhibit effective collaboration and leadership skills.

d) To have knowledge of the ethical and legal issues in data gathering, analysis and make ethically and culturally informed decisions in structured or unstructured and ambiguous situations.

e) To communicate technical information to both technical and non-technical audiences in speech, in writing and graphically.

f) To critically analyze, synthesize and solve complex unstructured business problems and encourage an aptitude for business improvement, innovation and entrepreneurial action.

Program Scope:

The Master of Science in Business Analytics (MSBA) at the Riphah International University is a STEM Designated program that will provide students with the required skills to succeed in data-rich business environments. The program offers rigorous, hands-on training that will prepare you to use data and analytics to identify business opportunities, generate insights, and create value for both customers and companies.

Once you've completed the MS in Business Analytics program, there are many professional paths to explore. The skills you have developed will not only fill your resume to make you more marketable, but also greatly improve the impact you are able to make on the job and in your company. An MS-BA program can significantly expand the graduates' career opportunities and increase their salary-earning potential. The graduates of MS-BA can find a number of pathways to choose from, such as business analytics consultants, operations analysts, people analysts, financial analysts, and market or consumer analysts.

Eligibility Criteria:

16 years' education with 50% marks or 2.0 CGPA in disciplines related to Business Administration, Commerce, Computer sciences, Engineering and Economics are eligible for this program. The program comprises of 36 credit hours and is based on two streams. Research Thesis Stream requires the student to complete 10 Courses of total 30-credit hours and one Research

Thesis of 6-credit hours. Course Work Stream requires the student to complete 10 Courses of 3 credit hours each and 2 additional courses of 3 credit hours in lieu of thesis. The minimum time duration to earn MS Business Analytics degree by either stream is 1.5 years. The maximum duration to complete this degree is 4 years.

Duration: 1.5 to 04 years

Selection Criteria:

- Academic Qualification: 30%
- Test/ Interview: 70%

Credit Hours: 36

Class Timings: (Evening & Weekend)

Scholarships: Need & merit-based scholarships as per university policy

Program Structure:

No.	Category/ Area	No. of Course	No. of Credit Hours
A.	Core Courses	07	21
B.	Elective	03	09
C.	Research Thesis / Two Courses	02	06
Total Credit Hrs.			36

Core Courses:
1. Advance Research Methods.
2. Tools for Business Analytics.
3. Data Mining & Deep Learning.
4. Quantitative Techniques & Modelling.
5. Machine Learning for Business Analytics.
6. Data Driven Decision Making & Optimization.
7. Professional Ethics & Decision Making.

General Elective:
1. Econometrics.
2. Predictive Modelling.
3. Data Structures & Business Applications.
4. Financial Analytics.
5. Marketing Analytics.
6. Healthcare Analytics.
7. HR Analytics.
8. Project Analytics.

9. Evidence Based Leadership

Semester-wise Breakup:

First Semester (Max 12 Cr. Hrs.)			
Advanced Research Methods (3 Cr. Hr.)	Tools for Business Analytics (3 Cr. Hr.)	Data Mining & Deep Learning (3 Cr. Hr.)	Elective I (3 Cr. Hr.)
Second Semester (Max 12 Cr. Hrs.)			
Quantitative Techniques & Modelling (3 Cr. Hr.)	Machine Learning for Business Analytics (3 Cr. Hr.)	Professional ethics & Decision Making (3 Cr. Hr.)	Elective II (3 Cr. Hr.)
Summer Semester (Max 6 Cr. Hrs.)			
Data Driven Decision Making & Optimization		Elective III (3 Cr. Hr.)	
Thesis (6 Cr. Hrs.) / 2 Electives in lieu of Thesis (3 Cr. Hrs. each)			

Course Catalogue:

Following is the brief of the some of the courses designed for MS-Business Analytics program:

Advanced Research Methods:

The Research Methods Course provides the knowledge and understanding of research design and methods appropriate for research. It is concerned with the formulation of research questions or hypotheses and the design of the research process and the ensuing process of investigation. The course is a necessary pre-requisite for the Masters dissertation. The course addresses a wide range of business research methods including various methods of data collection and analysis. Topics will include research planning, sampling, exploratory research, interviews, secondary data analysis, survey methodology, and quantitative analytical methods. The main aim of the course is for students to develop an understanding of the business research process, and to address this aim, the course is divided into two sections. Part 1 will address research planning and data collection; Part 2 will address analysis of collected quantitative data.

Tools for Business Analytics:

Analytics has been defined as the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions. Analytics is more than just analytical methodologies or techniques used in logical analysis. It is a process of transforming data into actions through analysis and insights in the context of

organizational decision making and problem solving. Analytics includes a range of activities, including business intelligence, which is comprised of standard and ad hoc reports, queries and alerts; and quantitative methods, including statistical analysis, forecasting/ extrapolation, predictive modeling (such as data mining), optimization and simulation.

Data Mining and Deep Learning:

The course "Machine Learning and Data Mining" introduces students to new and actively evolving interdisciplinary field of modern data analysis. Started as a branch of Artificial Intelligence, it attracted attention of physicists, computer scientists, economists, computational biologists, linguists and others and become a truly interdisciplinary field of study. In spite of the variety of data sources that could be analyzed, objects and attributes that from a particular dataset poses common statistical and structural properties. The interplay between known data and unknown ones give rise to complex pattern structures and machine learning methods that are the focus of the study. In the course we will consider methods of Machine Learning and Data Mining. Special attention will be given to the hands-on practical analysis of the real world datasets using available software tools and modern programming languages and libraries.

Quantitative Techniques and Modelling:

The purpose of this course is to provide an introduction to both basic and advanced analytical tools for business disciplines. Beginning with simple statistical methods, the course builds to more robust analytical techniques such as multivariate linear regression. Emphasis is placed on theoretical understanding of concepts as well as the application of key methodologies used by industry. This course also aims to promote a critical perspective on the use of statistical and econometric information.

Machine Learning for Business Analytics:

This course provides a broad introduction to machine learning, data mining, and statistical pattern recognition. Topics include: (i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks). (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning). (iii) Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI). The course will also draw from numerous case studies and applications, so that you'll also learn how to apply learning algorithms to building smart robots (perception, control), text understanding (web search, anti-spam), computer vision, medical informatics, audio, database mining, and other areas.

Professional Ethics and Decision Making:

In this course, we will explore the moral, social, and ethical ramifications of the choices we make at the different stages of the data analysis pipeline, from data collection and storage to understand feedback loops in analysis. Through class discussions, case studies and exercises, students will learn the basics of ethical thinking in science, understand the history of ethical dilemmas in scientific work, and study the distinct challenges associated with ethics in modern data science.

Data Driven Decision Making and Optimization:

Data Driven Decision Making is designed for teams, managers, and executives to learn how to use data driven thinking to design decisions around strategy, process, business intelligence products, business structures and the customer experience. Big data is a symptom of our times, a challenge, but ultimately THE opportunity for the modern enterprise to differentiate and disrupt. There is almost no latency for business decisions in today's hyper-competitive climate. Data driven thinking empowers the enterprise to act. Companies with purposeful, data driven approaches to decisions outperform their peers in output and productivity. In fact, the highest performing organizations use data driven approaches five times more than the lowest performing organizations. This course provides a foundation for how to curate data to support decision making at all levels of the enterprise. The course also provides instruction on systems thinking with a focus on complex systems, and lastly decision engineering. Four use cases are included to provide real world examples of data driven decision making.

Econometrics:

Econometrics is a set of research tools used to estimate and test economic relationships. The methods taught in this introductory course can also be employed in the business disciplines of accounting, finance, marketing and management and in many social science disciplines. The aim of this course is to provide you with the skills helpful in filling the gap between being "a student of economics" and being "a practicing economist." By taking this introduction to econometrics you will gain an overview of what econometrics is about, and develop some "intuition" about how things work. The emphasis of this course will be on understanding the tools of econometrics and applying them in practice.

Predictive Modelling:

This course will introduce you to some of the most widely used predictive modeling techniques and their core principles. By taking this course, you will form a solid foundation of predictive

analytics, which refers to tools and techniques for building statistical or machine learning models to make predictions based on data. You will learn how to carry out exploratory data analysis to gain insights and prepare data for predictive modeling, an essential skill valued in the business. You'll also learn how to summarize and visualize datasets using plots so that you can present your results in a compelling and meaningful way. We will use a practical predictive modeling software, XLMiner, which is a popular Excel plug-in. This course is designed for anyone who is interested in using data to gain insights and make better business decisions. The techniques discussed are applied in all functional areas within business organizations including accounting, finance, human resource management, marketing, operations, and strategic planning.

Data Structures and Business Applications:

Data structures are essential building blocks for designing efficient algorithms. Thus, they play a central role in analytics and are important in many areas of electrical engineering, computational biology, computer science and computational finance, etc. They are used in a variety of applications today including search engines (e.g., Google, Bing), social networking applications (e.g., Facebook, Twitter), embedded systems (e.g., cell phones, robots), and DNA analysis. This course will introduce the fundamentals of data structures and will provide a thorough understanding of how to systematically organize data in a computer system. In addition, this course will introduce students to analytical tools for comparing data structures in terms of their time and space complexities. Moreover, students will appreciate the importance of programming structures, abstractions, and algorithms for improving the efficiency of computer programs.

Financial Analytics:

The Financial Analytics program is structured around a core of courses covering data science, risk management and time series, and their applications in finance. The core concludes with a capstone consulting or research experience. You will customize your degree through a set of four electives, including the chance to pursue a structured specialization tailored to your career interests; a close relationship between you and your faculty advisor will help you select the right classes for your future.

Marketing Analytics:

Marketing Analytics is an application of data science to marketing decision problems. The course explores customer data analysis techniques and their theoretical foundations to help students

acquire analytic skills that can be applied to real world marketing problems. The course also examines the ethical and technical issues related to data privacy.

Healthcare Analytics:

This introductory course is designed for graduate students who intend to understand the process of analysis of patient data, genomic databases, and electronic health records (EHR) to improve patient care, and to achieve greater efficiencies in public and private healthcare systems. The course explores the concept of clinical intelligence and the role of analytics in supporting a data-driven learning healthcare system. The aim is to focus beyond data collection, to analyzing available data and making it into actionable information. Key topics include the value-driven healthcare system, measuring health system performance, existing quality/performance measurement frameworks (HEDIS), Analytics maturity model (DELTA), comparing healthcare delivery, attributes of high performing healthcare systems, and the IT infrastructure and human capital needed to leverage analytics for health improvement. We will also look at open-source and web-based warehousing tools to perform practical use of healthcare analytics.

HR Analytics:

This course provides the analytics knowledge, skills, and competencies to address human capital issues in private, public, and not-for-profit organizations. It introduces the central concepts of people orientated analytics and via hands-on exercises, builds skills and competencies around the management, analysis and representation of data. The subject explores how analytics helps managers to address both tactical and strategic level human capital issues.

Project Analytics:

This 2 year Master's courses will give you the opportunity to be awarded a subject specific degree in Project Management with Data Analytics. The course will improve your knowledge and skills to manage projects effectively in the commercial, public and third sectors (including the voluntary sector). You will learn from your experience of managing real projects by critically assessing a range of project management methodologies, tools and techniques. The Data Analytics units cover a wide range of topics including programming, databases, security, project management and computer networking, giving you both the underpinning theory and the ability to apply it to complex real-world problems.