

BUSINESS ANALYTICS

OVERALL COURSE OBJECTIVES:

To equip students with a comprehensive understanding of business analytics, data preparation, algorithm application, predictive modeling, and decision-making models with the goal of applying data analytics to real-world business challenges. The curriculum aims to enable students to analyze, interpret, and present data for effective decision making across various business domains.

LEARNING OUTCOMES: On successful completion of the course the students shall be able to:

1. Understand key analytics concepts and the breadth of analytic possibilities across various industries.
2. Use a data analytic language, R, to efficiently prepare business data for analytic tools such as algorithms and visualizations.
3. Develop an analytic mindset for approaching business problems and appraise the value of datasets for addressing these problems using business analytic software applications.
4. Apply data analytics practices executed in the business world with a focus on the analytical process, how data is created, stored, and accessed.
5. Learn to use SAS Visual Analytics on SAS Viya to modify data for analysis, perform data discovery and analysis, and create interactive reports.
6. Create models for decision making using techniques such as cluster analysis and Monte Carlo simulation.

Business Analytics Foundations – I	Business Analytics Executive Overview
	Introduction to Business Analytics with R
Business Analytics Foundations – II	Introduction to Business Analytics: Communicating with Data
	Tools for Exploratory Data Analysis in Business
	Introduction to Data Analytics for Business
Business Analytics - Industry Applications and Tools	Machine Learning Algorithms with R in Business Analytics
	Applying Data Analytics in Marketing
	Applying Data Analytics in Accounting
Visual Analytics and Reporting	Inferential and Predictive Statistics for Business
	Exploring and Producing Data for Business Decision Making
	Getting Started with SAS Visual Analytics
	Data Analysis and Reporting in SAS Visual Analytics
Business Analytics - Strategy	Predictive Modeling and Analytics
	\Business Analytics for Decision Making
	Communicating Business Analytics Results
	Advanced Business Analytics Capstone

COURSE CONTENT:

Module 1 : [Business Analytics Executive Overview](#) [17 Hours]

Businesses run on data, and data offers little value without analytics. The ability to process data to make predictions about the behavior of individuals or markets, to diagnose systems or situations, or to prescribe actions for people or processes drives business today. Increasingly many businesses are striving to become “data-driven”, proactively relying more on cold hard information and sophisticated algorithms than upon the gut instinct or slow reactions of humans.

This course will focus on understanding key analytics concepts and the breadth of analytic possibilities. Together, the class will explore dozens of real-world analytics problems and solutions across most major industries and business functions. The course will also touch on analytic technologies, architectures, and roles from business intelligence to data science, and from data warehouses to data lakes. And the course will wrap up with a discussion of analytics trends and futures.

Sub-Topics:

Analytics Beyond the Spreadsheet
Industry and Business Function Analytics
Staffing and Organizing for Analytics

Analytics Success Today and Tomorrow

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 2 : [Introduction to Business Analytics with R](#) [17 Hours]

Nearly every aspect of business is affected by data analytics. For businesses to capitalize on data analytics, they need leaders who understand the business analytic workflow. This course addresses the human skills gap by providing a foundational set of data processing skills that can be applied to many business settings.

In this course you will use a data analytic language, R, to efficiently prepare business data for analytic tools such as algorithms and visualizations. Cleaning, transforming, aggregating, and reshaping data is a critical, but inconspicuous step in the business analytic workflow.

As you learn how to use R to prepare data for analysis you will gain experience using RStudio, a powerful integrated development environment (IDE), that has many built-in features that simplify coding with R.

As you learn about the business analytic workflow you will also consider the interplay between business principles and data analytics. Specifically, you will explore how delegation, control, and feasibility influence the way in which data is processed. You will also be introduced to examples of business problems that can be solved with data automation and analytics, and methods for communicating data analytic results that do not require copying and pasting from one platform to another.

Sub-Topics:

How Do I Get Started Using a Data Analytic Language to Solve Business Problem?

How Do I Get to Know My Data and Share It With Others?

How Can I Use Functions to Help with Data Preparation?

How Do I Preprocess Data?

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 3 : [Introduction to Business Analytics: Communicating with Data](#) [16 Hours]

This course introduces students to the science of business analytics while casting a keen eye toward the artful use of numbers found in the digital space. The goal is to provide businesses and managers with the foundation needed to apply data analytics to real-world challenges they confront daily in their professional lives. Students will learn to identify the ideal analytic tool for their specific needs; understand valid and reliable ways to collect, analyze, and visualize data; and utilize data in decision making for their agencies, organizations or clients.

Sub-Topics:

Pictures You See With Your Brain

Working Fast and Thinking Slow

Finding Your Data Story

Getting Your Story Across

Formative Assessments:

4 Peer Review Assignments & 3 Graded Quizzes

Module 4 : [Tools for Exploratory Data Analysis in Business](#) [18 Hours]

This course introduces several tools for processing business data to obtain actionable insight. The most important tool is the mind of the data analyst. Accordingly, in this course, you will explore what it means to have an analytic mindset. You will also practice identifying business problems that can be answered using data analytics. You will then be introduced to various software platforms to extract, transform, and load (ETL) data into tools for conducting exploratory data analytics (EDA). Specifically, you will practice using PowerBI, Alteryx, and RStudio to conduct the ETL and EDA processes.

The learning outcomes for this course include:

1. Development of an analytic mindset for approaching business problems.
2. The ability to appraise the value of datasets for addressing business problems using summary statistics and data visualizations.
3. The ability to competently operate business analytic software applications for exploratory data analysis.

Sub-Topics:

Analytics Mindset

ETL and EDA Using PowerBI

ETL and EDA Using RStudio

ETL and EDA Using Alteryx

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 5 : [Introduction to Data Analytics for Business](#) [12 Hours]

This course will expose you to the data analytics practices executed in the business world. We will explore such key areas as the analytical process, how data is created, stored, accessed, and how the organization works with data and creates the environment in which analytics can flourish.

What you learn in this course will give you a strong foundation in all the areas that support analytics and will help you to better position yourself for success within your organization. You'll develop skills and a perspective that will make you more productive faster and allow you to become a valuable asset to your organization.

This course also provides a basis for going deeper into advanced investigative and computational methods, which you have an opportunity to explore in future courses of the Data Analytics for Business specialization.

Sub-Topics:

Analytical Tools

Data and Analysis in the Real World

Data Extraction Using SQL

Real World Analytical Organizations

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 6 : [Machine Learning Algorithms with R in Business Analytics](#) [14 Hours]

One of the most exciting aspects of business analytics is finding patterns in the data using machine learning algorithms. In this course you will gain a conceptual foundation for why machine learning

algorithms are so important and how the resulting models from those algorithms are used to find actionable insight related to business problems. Some algorithms are used for predicting numeric outcomes, while others are used for predicting the classification of an outcome. Other algorithms are used for creating meaningful groups from a rich set of data. Upon completion of this course, you will be able to describe when each algorithm should be used. You will also be given the opportunity to use R and RStudio to run these algorithms and communicate the results using R notebooks.

Sub-Topics:

Regression Algorithm for Testing and Predicting Business Data
Framework for Machine Learning and Logistic Regression
Classification Algorithms
Clustering Algorithms

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 7 : [Applying Data Analytics in Marketing](#) [15 Hours]

This course introduces students to marketing analytics through a wide range of analytical tools and approaches. We will discuss causal analysis, survey analysis using regression, textual analysis (sentiment analysis), and network analysis. This course aims to provide the foundation required to make better marketing decisions by analyzing multiple types of data related to customer satisfaction.

Sub-Topics:

Causal Analysis
Survey Analysis
Text Analysis
Network Analysis

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 8 : [Applying Data Analytics in Accounting](#) [14 Hours]

This course explores business analytic applications in accounting. First, it presents a survey of technology topics in accounting, including process mining, blockchain and applications in audit, tax, and assurance. Next, the course explores visualization and basic analytics in audit and control testing using R and Alteryx. Next, the course examines the uses of text analysis in accounting and conducts text analysis using R and RStudio. Finally, the course examines robot process automation in general using UiPath and its applications in accounting.

Sub-Topics:

Survey Of Analytics Topics In Accounting
Controls And Auditing
Text Processing And Analysis In Accounting
Robot Process Automation In Accounting

Formative Assessments:

4 Graded Quizzes

Module 9 : [Inferential and Predictive Statistics for Business](#) [19 Hours]

This course offers an analytical framework to help you systematically address key business issues and manage the uncertainties that complicate business processes. It dives into statistical ideas relevant to managers, focusing on recognizing and describing variations and then modeling and making decisions considering these variations. While it introduces the science behind the teachings, the emphasis is on the application of methodologies using Excel and diverse data sets. The course facilitates understanding the meaning of obtained results and enables you to test beliefs about a population, compare differences between populations, and use a linear regression model for prediction. It is a part of Gies College of Business' suite of online programs, including the iMBA and iMSM.

Sub-Topics:

Hypothesis Testing
Statistical Inference Based on Two Samples
Simple Linear Regression
Multiple Linear Regression

Formative Assessments:

4 Graded Quizzes

Module 10 : [Exploring and Producing Data for Business Decision Making](#) [23 Hours]

The course offers an analytical framework to help you examine key business issues in a structured manner and equip you with methodologies to manage uncertainties within business processes. It imparts extensive knowledge of data summarization, frequency, normal distribution, statistical studies, sampling, and confidence intervals. Keeping application as its focus, the course employs data sets from various disciplines and Excel, facilitating a wide range of uses for the learned statistics. You'll learn not just the explanation of these concepts, but also the interpretation of the results drawn. By the end, you'll be proficient in summarizing large data sets, understanding sampling significance, applying normal distribution, making population inferences from sample data with confidence intervals, and using Excel for statistical analysis. The course is a part of the Gies College of Business' suite of online programs, including the iMBA and iMSM.

Sub-Topics:

Summarizing Data
Frequency Tables in Excel: Quantitative & Qualitative Data
Descriptive Statistics and Probability Distributions
Sampling and Central Limit Theorem
Impact of Confidence Level Illustrated in Excel

Formative Assessments:

1 Peer Review Assignments & 4 Graded Quizzes

Module 11 : [Getting Started with SAS Visual Analytics](#) [5 Hours]

In this course, you learn more about SAS Visual Analytics and the SAS Viya platform, how to access and investigate data in SAS Visual Analytics, and how to prepare data for analysis using SAS Data Studio.

Sub-Topics:

Business Scenario: Basics
Cloud Analytic Services (CAS)
SAS Visual Analytics Methodology

Preparing Data Using SAS Data Studio
Accessing and Investigating Data

Formative Assessments:

2 Graded Quizzes

Module 12 : [Data Analysis and Reporting in SAS Visual Analytics](#) [9 Hours]

In this course, you learn how to use SAS Visual Analytics on SAS Viya to modify data for analysis, perform data discovery and analysis, and create interactive reports.

Sub-Topics:

Analyzing Data Using SAS Visual Analytics
Designing Reports with SAS Visual Analytics
Working with Graph-Level Display Rules

Formative Assessments:

2 Graded Quizzes

Module 13 : [Predictive Modeling and Analytics](#) [11 Hours]

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. The expected prerequisites for this course include a prior working knowledge of Excel, introductory level algebra, and basic statistics.

Sub-Topics:

Exploratory Data Analysis and Visualizations
Predicting a Binary Outcome
Predicting a Continuous Variable
Trees and Other Predictive Models

Formative Assessments:

1 Peer Review Assignments & 6 Graded Quizzes

Module 14 : [Business Analytics for Decision Making](#) [9 Hours]

In this course you will learn how to create models for decision making. We will start with cluster analysis, a technique for data reduction that is very useful in market segmentation. You will then learn the basics of Monte Carlo simulation that will help you model the uncertainty that is prevalent in many business decisions. A key element of decision making is to identify the best course of action. Since businesses problems often have too many alternative solutions, you will learn how optimization can help you identify the best option. What is really exciting about this course is that you won't need to know a computer language or advanced statistics to learn about these predictive and prescriptive analytic models. The Analytic Solver Platform and basic knowledge of Excel is all you'll need. Learners participating in assignments will be able to get free access to the Analytic Solver Platform.

Sub-Topics:

Data Exploration and Reduction — Cluster Analysis
Dealing with Uncertainty and Analyzing Risk
Decision Analytics
Identifying the Best Options — Optimization

Formative Assessments:

8 Graded Quizzes

Module 15 : [Communicating Business Analytics Results](#)[7 Hours]

The analytical process does not end with models that can predict with accuracy or prescribe the best solution to business problems. Developing these models and gaining insights from data do not necessarily lead to successful implementations. This depends on the ability to communicate results to those who make decisions. Presenting findings to decision makers who are not familiar with the language of analytics presents a challenge. In this course you will learn how to communicate analytics results to stakeholders who do not understand the details of analytics but want evidence of analysis and data. You will be able to choose the right vehicles to present quantitative information, including those based on principles of data visualization. You will also learn how to develop and deliver data-analytics stories that provide context, insight, and interpretation.

Sub-Topics:

Acting on Data
Best Practices in Data Visualization
Interpreting, Telling, and Selling
Introduction to the Course

Formative Assessments:

5 Graded Quizzes

Module 16 : [Advanced Business Analytics Capstone](#) [19 Hours]

The analytics process is a collection of interrelated activities that lead to better decisions and to a higher business performance. The capstone of this specialization is designed with the goal of allowing you to experience this process. The capstone project will take you from data to analysis and models, and ultimately to presentation of insights.

In this capstone project, you will analyze the data on financial loans to help with the investment decisions of an investment company. You will go through all typical steps of a data analytics project, including data understanding and cleanup, data analysis, and presentation of analytical results.

For the first week, the goal is to understand the data and prepare the data for analysis. As we discussed in this specialization, data preprocessing and cleanup is often the first step in data analytics projects. Needless to say, this step is crucial for the success of this project.

In the second week, you will perform some predictive analytics tasks, including classifying loans and predicting losses from defaulted loans. You will try a variety of tools and techniques this week, as the predictive accuracy of different tools can vary quite a bit. It is rarely the case that the default model produced by ASP is the best model possible. Therefore, it is important for you to tune the different models in order to improve the performance.

Beginning in the third week, we turn our attention to prescriptive analytics, where you will provide some concrete suggestions on how to allocate investment funds using analytics tools, including clustering and simulation based optimization. You will see that allocating funds wisely is crucial for the financial return of the investment portfolio.

In the last week, you are expected to present your analytics results to your clients. Since you will obtain many results in your project, it is important for you to judiciously choose what to include in your presentation. You are also expected to follow the principles we covered in the courses in preparing your presentation.

Sub-Topics:

Understand the data and prepare your data for analysis

Data Cleanup and Transformation

Cross Validation and Confusion Matrix

How to Build a Model using XLMiner

Defining output variables and analyzing results

Formative Assessments:

4 Peer Review Assignments

ASSESSMENT:

For summative assessments, Coursera will provide question banks for which exams can be conducted on the Coursera platform or the faculty will create their own assessments.

Note: If a Course or Specialization becomes unavailable prior to the end of the Term, Coursera may replace such Course or Specialization with a reasonable alternative Course or Specialization.