

# BUSINESS ANALYTICS

## **BUAN 370 | DESCRIPTIVE ANALYTICS & DATA MANAGEMENT**

### **Units: 3 Repeatability: No**

Prerequisites: ITMG 100 with a minimum grade of C- and (ECON 216 with a minimum grade of C- or ECON 217 with a minimum grade of C-) and (MATH 130 with a minimum grade of C- or MATH 150 with a minimum grade of C-)

Advances in our capability to generate and collect information coupled with decreasing disk#space prices are pushing us toward a world centered around data management. Data preparation and storage are the foundation of today's business analytics. They ensure data are properly processed for later meaningful analysis. Data preparation includes data cleansing and data transformation. The objective of data preparation is to collect the data from various sources into a single location and transform it into a form that is ready for later analysis. Databases are at the heart of modern commercial application development for data storage. Once data is prepared and properly stored, the first step of analysis usually involves summarizing basic facts about what has happened in the past. This preliminary examination of data falls in the category of descriptive analytics (exploratory data analysis). The purpose of this course is to provide a comprehensive introduction of the data management process # from data preparation, storage, to descriptive analytics applications. (Course can be taken upon completion of 45 units and completion of all other prerequisites.).

## **BUAN 371 | ANALYTICAL DECISION MODELING**

### **Units: 3 Repeatability: No**

Prerequisites: ITMG 100 with a minimum grade of C- and (ECON 216 with a minimum grade of C- or ECON 217 with a minimum grade of C-) and (MATH 130 with a minimum grade of C- or MATH 150 with a minimum grade of C-)

Many business situations can be represented by quantitative models, typically on spreadsheets. This course introduces prescriptive analytics, which is the branch of analytics focusing on identifying the best course of actions. The course will introduce quantitative models for business decision#making. Much emphasis will be placed on practical applications of the models. Topics to be covered include linear programming, integer programming, network models, non#linear programming and Monte Carlo simulation. The primary goal is to acquaint students in business and relevant disciplines with useful concepts, theories, and solution methods in predictive analytics. The problems examined in this course are simplified versions of those that may be encountered in many areas of business. While the approach is quantitative, this is not a mathematics course # we will not prove theorems or solve systems of equations. Instead, we will focus on problem formulation and rely on Excel to do the heavy lifting. In other words, we will focus on developing your model#building skills and managerial interpretation of results.

## **BUAN 381 | PREDICTIVE ANALYTICS & BIG DATA**

### **Units: 3 Repeatability: No**

Prerequisites: ITMG 100 with a minimum grade of C- and (ECON 216 with a minimum grade of C- or ECON 217 with a minimum grade of C-) and (MATH 130 with a minimum grade of C- or MATH 150 with a minimum grade of C-) and (BUAN 370 with a minimum grade of C- or (ECON 201 with a minimum grade of C- and ECON 202 with a minimum grade of C-))

Analytics is the process of transforming data into insight in order to make better-informed decisions. Predictive analytics is the branch of analytics problem type that focuses on the central question of "what will (or could) happen?" This involves making predictions by describing static and dynamic relationships using a collection of techniques including, but not limited to response surface modeling, simulation, and forecasting. This course will focus on developing a toolkit for solving two important and common types of prediction problems: 1) formulating a continuous prediction; 2) formulating a categorical (discrete) prediction. With these goals in mind, methodologies will be introduced by leveraging modern-day software implementation and machine learning when appropriate. By the end of the course, you will know how to estimate and assess the performance of (validate) a variety of predictive models for applications in business.

## **BUAN 390 | BUSINESS ANALYTICS STRATEGY**

### **Units: 3 Repeatability: No**

Prerequisites: ITMG 100 with a minimum grade of C- and (ECON 216 with a minimum grade of C- or ECON 217 with a minimum grade of C-) and (MATH 130 with a minimum grade of C- or MATH 150 with a minimum grade of C-) and (BUAN 370 with a minimum grade of C- or (ECON 201 with a minimum grade of C- and ECON 202 with a minimum grade of C-))

Business analytics refers to the ways in which enterprises such as businesses, nonprofits, and governments can use data to gain insights and make better decisions. The ability to use data effectively to drive rapid, precise, and profitable decisions has been a critical strategic advantage for many companies. In this course, we will examine how managers and other stakeholders can apply advanced statistical techniques and tools that are central to the analysis of structured data that is used in business decision making. Data visualization and exploratory analysis will be emphasized as a key first step in the analytics process. Students will go through the process of identifying the data needs of a company, identifying key questions, identifying and exploring data sources to address these needs & questions, study design, strategy for implementation of study design, and communication of results. Special emphasis will be on communicating and translating analytic information into actionable business intelligence. Students will explore a variety of industry sectors (business, financial, technology, healthcare, sports, social innovation/ "big data for social good", social media).

## **BUAN 470 | MACHINE LEARNING**

### **Units: 3 Repeatability: No**

Prerequisites: ITMG 100 with a minimum grade of C- and (ECON 216 with a minimum grade of C- or ECON 217 with a minimum grade of C-) and (MATH 130 with a minimum grade of C- or MATH 150 with a minimum grade of C-) and BUAN 370 with a minimum grade of C- and (BUAN 381 or ECON 381 or BUAN 390 or ECON 390)

The goal of the class is to develop practical working knowledge of the tools and methods for using machine learning, as well as talking knowledge of underlying concepts that go into algorithms, so that one can explain why/how methods apply for different kinds of use cases. The class combines in class demonstrations/ tutorials of certain tools/languages, such as Weka, R, Python, with graphical depictions/programming exercises that involve certain mathematical concepts, including maximizing fit/optimization, dimension reduction/matrix factorization, evaluation methods, Bayesian learning, matrix operations, etc.. Content includes various predictive models, such as Random Forests, Naïve Bayes, and larger landscape of models relate, including the latest Neural Networks for deep learning. Data techniques will be reviewed or discussed as needed, but the emphasis will be on models.

