

# BUSINESS ANALYTICS (BSAN)

## **BSAN 5998 Business Analytics (0-3 semester hours)**

### **BSAN 6010 Fundamentals of Business - Accounting, Finance & Operations (3 semester hours)**

This course provides the fundamental principles of financial reporting, managerial accounting, operations and supply chain management. This course provides a business perspective that focuses on cross-functional decision-making. Students will learn the role of each function in organizations as well as how information flows between different business functions. Students will create and review balanced scorecards that provide a comprehensive view of a business by focusing on the operational and developmental performance of the organization as well as its financial measures.

### **BSAN 6011 Operations and Supply Chain Analytics (1.5 semester hours)**

This course provides fundamental principles of operations and supply chain management along with a business perspective that focuses on cross-functional decision-making. Students will learn how information flows between different business entities and how systems can be improved using basic analytics. Topics include time series forecasting, aggregate planning, quality management, production process strategies and design, inventory management, location analysis, transportation systems and supply chain design. M.S. Business Analytics majors only.

### **BSAN 6020 Marketing for Managers (3 semester hours)**

In this course we will emphasize the role of marketing and marketing management in society. Basic controllable variables essential to marketing success will be examined including market analysis, product development, pricing, distribution, and promotion. We will explore how marketing facilitates business strategy, discovers and creates demand for products/services, and influences product development.

### **BSAN 6030 Programming for Data Management (3 semester hours)**

This course introduces learners to Python programming for data analytics. It introduces the basics of programming (algorithms, variables and data types, operators, looping and branching) and provides a working knowledge of Python libraries to process data. It includes how to retrieve, clean, manipulate, and analyze structured and unstructured data. Students will also be introduced to the basics of data management architecture such as relational databases and data warehouses, as well as use of SQL within Python for querying and interacting with such data architectures. Prerequisite: Completion of a college statistics course in the last four years with a grade of B or better.

### **BSAN 6040 Data, Models and Decisions for Analytics (3 semester hours)**

The course introduces students to the process of understanding, displaying, visualizing and transforming data into insight in order to help managerial decision makers make better, more informed, data-driven decisions. The course provides a basic introduction to cleaning data as well as exploring data with descriptive analytics and visualization techniques. It also provides an introduction to predictive analytics (forecasting and regression), and prescriptive analytics (simulation and optimization). The course will require the use of Excel, Tableau, and other specialized analytics and decision-making software. Prerequisite: Completion of a college statistics course in the last four years with a grade of B or better.

### **BSAN 6050 Customer Relationship Management Analytics (3 semester hours)**

Customer relationship management (CRM) is a business strategy paradigm that focuses on the systematic development of ongoing, collaborative customer relationships as a key source of sustainable competitive advantage. CRM represents a fundamental change in approach from traditional marketing; the goals shift from market share to share of customer. Operating under the assumption that competitive advantage is often gained through building customer equity, this course introduces the theory and practical implementation of customer relationship management strategies using customer databases. CRM Strategy Topics include: fundamentals of CRM strategy, customer profiling, measuring customer life-time value, customer profitability analysis, customer loyalty programs, and CRM technology overview. CRM Analytic Topics include: modeling customer lifetime value with linear regression, logistic regression for churn prevention, modeling time to reorder with survival analyses, association rules for market basket analyses, and customer profitability analyses. Students will be introduced to R programming and Excel-based analytic tools. Prerequisite: Completion of a college statistics course in the last four years with a grade of B or better.

### **BSAN 6060 Data Management for Business Intelligence (3 semester hours)**

Current management practices place an increasing dependence on the use of information to manage a business--business intelligence systems and analytics tools play a critical role in this regard. To help managerial decision makers do their job effectively, it is necessary to understand the decision-making process, the nature of data/information used in the decision making process and the role of information technology (in particular, business intelligence technologies) in that process. Data plays a significant role in creating a robust and reliable business intelligence system. This course focuses on various data wrangling tools and techniques that teach how to collect, store and clean data. We will focus on using various business analytics tools for extracting, transforming and loading data into an "analytics ready" data format. Students will also learn about different data storage architectures, such as relational and non-relational databases and data warehouses, as well as Big Data architecture and management of Big Data. Prerequisite: BSAN 6040 (with a minimum grade of C+).

### **BSAN 6070 Introduction to Machine Learning (3 semester hours)**

This course will provide students a hands-on application-oriented exposure to machine learning (ML), while taking a deep dive into the fundamentals of supervised and unsupervised machine learning algorithms, model selection, feature engineering, data fitting, model evaluation and optimization. Students will also learn how to instantiate, test, and deploy ML models using platforms such as Azure ML and Python libraries using real life data sets. Finally, students will develop the skills to interpret ML based predictive models to support business decision making. Prerequisite: BSAN 6030 (with a minimum grade of B-).

### **BSAN 6080 Strategic Analytics Integration (3 semester hours)**

This course integrates concepts, tools, methods, and applications of modeling and strategic decision making in business. Students will develop a working knowledge of quantitative data-driven decision-making approaches, such as perceptual mapping, choice models, optimization, regression, cluster analysis, conjoint analysis, and diffusion modeling. This course is aimed at providing students, as future managers and/or data scientists, with the set of tools and skills needed to make intelligent and critical use of data in systematic decision making. Prerequisites: BSAN 6040 and BSAN 6050. M.S. Business Analytics majors only.

**BSAN 6088 Statistics Bootcamp and Capstone Project Preparation I (0 semester hours)**

This class is a mandatory workshop series to establish a baseline in statistics fluency and to help students prepare for the Summer Capstone Project. A portion of the workshops serves as a refresher for basic statistics concepts required in order to understand the program material. Other workshops cover how to identify and frame a business problem with the objective of delivering measurable business value and how to perform effectively as a team. Teams will be formed for the Summer Capstone Project and matched with industry clients so that teams can start working on identifying and framing their client's business problem. M.S. Business Analytics majors only. Credit/No Credit only.

**BSAN 6089 Capstone Project Preparation II: Research Design, Project Management, and People Dynamics (0 semester hours)**

This class is a mandatory workshop series covering the research design process to facilitate the Summer Capstone Project's approach to the identified business problem. Throughout the workshops, students will have the opportunity to learn about and practice the various interactions between the project team members, stakeholders, and clients. One of the workshops will cover experimental design. Teams will then start to collect data for their project and learn how to take into account ethical considerations when dealing with the data. Prerequisite: BSAN 6088. M.S. Business Analytics majors only. Credit/No Credit only.

**BSAN 6090 Capstone Project I (3 semester hours)**

Students will practice team-oriented problem-solving skills in the context of undertaking and completing a live business analytics project. They will demonstrate their knowledge and understanding of business concepts and analytics techniques in identifying and structuring a problem, collecting and managing data, and applying analytic modeling techniques to provide insights and recommendations for the project. The course will enable students to acquire and demonstrate their understanding, use, and proficiency in project management skills related to tackling business analytics projects as they work with a real client. Students may have to identify, learn and apply new skills and techniques that were not taught in BSAN courses but are needed to address the client's problem. Prerequisite: BSAN 6060, BSAN 6070 and BSAN 6080 (all with a minimum grade of C+), BSAN 6089. M.S. Business Analytics majors only.

**BSAN 6095 Capstone Project II (3 semester hours)**

Students will continue to acquire and demonstrate their understanding, use, and proficiency in project management and business analytic skills as they work on the real business analytics project started in BSAN 6090. Students will practice their written and oral communication skills as well as their ability to generate insights through data visualization techniques in the write-up and presentation of their projects to effectively communicate with their clients. Prerequisite: BSAN 6090. M.S. Business Analytics majors only.

**BSAN 6100 Data Visualization and Geographic Information Systems (3 semester hours)**

A picture is worth a thousand words, and a map is worth a thousand pictures. This course is intended to equip students with principles, skills, tools, and techniques in data visualization to be able to tell a story through data visually. Students will be able to uncover relationships between data in exploratory data analysis through visualization and present meaningful and interactive reports to non-technical persons, managers, and executives. In addition, students will dive into the use of Geographic Information Systems (GIS), where students can explore data spatially. Topics include data visualization design principles, exploratory data analysis through visualization, interactive dashboard creation, introduction to GIS tools and techniques, and hot spot analysis.

**BSAN 6198 Special Studies (1-3 semester hours)**

3-unit 6198 courses will fulfill an elective requirement for the M.S. Business Analytics program

**BSAN 6200 Text-Mining and Social Media Analytics (3 semester hours)**

This course illustrates the functionalities of text mining and analytics as a business decision-making tool by using a variety of statistical methods to collect and analyze text data. Computational linguists have developed a research stream of understanding and analyzing text. Consequently, business organizations are acquiring knowledge on techniques of text analytics to make a better decision. Due to a large pool of unstructured text entangled in social media, leveraging effective text analytic method is the next leading edge. This course encompasses the fundamentals of computational linguistics that will include some technical features but will mostly emphasize the business application of text analytics. Business and industry cases are used to demonstrate the usefulness and effectiveness of the text analytics techniques used. Students use software to perform computational studies, obtain solutions, and analyze the results. This course also examines what business decisions can be promoted by text analytics as well as effective techniques for rapidly solving the business problems. Prerequisites: BSAN 6030 and BSAN 6040 or MBAA 6080 (both with a minimum grade of B-).

**BSAN 6300 Marketing Analytics (3 semester hours)**

Marketing analytics refers to the techniques, practices, and processes of analyzing data related to markets and customers for deeper insights and better decisions. The focus on this course is to facilitate the students to possess the right skills to participate in the cooperative ecosystem of marketing analytics. This includes obtaining contextual knowledge (students will be able to employ a systematic framework to obtain contextual knowledge from industrial practitioners before they start to college and analyze data); applying proper quantitative methods (students will be able to design proper sampling strategy and choose suitable methods for various problems and types of data); communicating insights (students can translate the analytical results into business insights and communicate the insights to their audiences like managers, customers, policymakers effectively). Specific modules of this course include introduction to marketing analytics, customer segmentation, customer life-time value, promotion and advertising, user generated contents and social media analytics, sales force analytics, sampling and experiment design, confounding factors in analytics, communication of marketing analytics. Students will practice the methods with R, Excel, and other necessary tools. Prerequisite: BSAN 6050 and BSAN 6040 or MBAA 6080 (both with a minimum grade of B-).

**BSAN 6400 Healthcare Analytics (3 semester hours)**

The initiation of ARRA by the US Federal government in 2009 has led to a significant impact in the Health Information Technology (HIT). One of the areas where the impact is distinctly visible is digitization of health records and its widespread adoption. Enterprise scale health information management software suites have led to organized capture, storage, and distribution of healthcare data in electronic form, making the healthcare vertical ripe and ready for analytic applications. The advances of modern data analytics, when combined with the HIT has already started demonstrating a potential of fundamentally changing the paradigm of disease diagnostics, medical decision making, and patient management. This introductory graduate level course is designed to provide an integrated perspective of healthcare information systems (EHR/PHR), data analytics, and the healthcare domain. Building on the concepts and vocabulary of these fields, students will carry out research and projects to develop analytics applications using data sets from the healthcare domain. This course will be suitable for students with healthcare domain knowledge, seeking training in data analytics and HIT as well as students with information technology and analytics knowledge seeking training in the healthcare domain. Prerequisites: BSAN 6030 (with a minimum grade of B-)