

ANALYTICS (DATA)

DATA 2101 Business Analytics 3 Credits

Prerequisites: MATH 2217, sophomore standing.

This course introduces basic skills necessary for business analytics such as data analysis and preparation, probability and statistical modeling, data-driven decision making, and persuasion/storytelling with data. Spreadsheets are used as the platform for conducting analyses, performing statistical calculations, and presenting results. Previously BUAN 2101.

DATA 2980 Internship 1 Credit

Prerequisite: Sophomore standing.

Students may take up to two semesters of a department-approved internship. Students must be matriculated in the Dolan School of Business and have a GPA of 2.5 or higher. Previously BUAN 2980.

DATA 3210 Business Analytics Methods 3 Credits

Prerequisites: DATA 2101, junior standing.

This course focuses on quantitative modeling and analyzing business problems using spreadsheet software such as Excel, and data visualization software such as Tableau. Topics include descriptive analytics, visualizing and exploring data, predictive modeling, regression analysis, time series analysis, portfolio decisions, risk management, and simulation. Business models relevant to finance, accounting, marketing, and operations management are set up and solved, with managerial interpretations and "what if" analyses to provide further insight into real business problems and solutions. Previously IS 0210, BUAN 3210.

DATA 3235 Python Apps for Busn Analytics 3 Credits

Prerequisite: DATA 3210.

This course introduces students to business analytics using Python. Students should gain a fundamental understanding of how analytics can be done using Python. Business problems will be used for assignments and projects. Technical topics include reading/writing to files, data types, variables, simple control logic, loops, strings, lists, dictionaries, functions, and structure. Previously IS 0235, BUAN 3235.

DATA 3260 Database Systems 3 Credits

Prerequisite: DATA 2101.

The course begins by covering fundamental database concepts, such as data models, and then moves on to design concepts such as entity-relationship modeling. This essential background leads to in-depth study and hands-on use of the Structured Query Language (SQL) for defining, manipulating, accessing and managing data. A comprehensive semester-wide team project gives students an opportunity to bring together several database design and implementation concepts. Previously IS 0260, BUAN 3260.

DATA 3335 Sports Analytics 3 Credits

Prerequisite: DATA 2101.

Virtually every sport has been improved in recent years with the introduction and widespread acceptance of analytical methods. Analytics help leagues, teams, referees, coaches, athletes, agents, and fans appreciate their favorite sports on a higher level. In this course, students will gain a broad perspective on the methods, findings, impact, and controversies within sports analytics across a variety of sports and e-sports, learn how to analytically evaluate and compare differing perspectives, and practice communicating findings to a non-analytical audience in an impactful and actionable way.

DATA 3980 Internship 3 Credits

Prerequisite: Junior standing.

Students may take up to two semesters of a department-approved internship. Students must be matriculated in the Dolan School of Business and have a GPA of 2.5 or higher. Previously BUAN 3980.

DATA 4310 Business Intelligence 3 Credits

Prerequisites: DATA 3210, DATA 3260.

Business Intelligence (BI) is an umbrella concept covering the processes and methods of collecting, storing, and analyzing data generated from business operations or activities to make informed business decisions. Disparate industries, such as retail, healthcare, and education, have adopted BI for various decision support purposes. Since data in today's business environments is vast in volume and grows at a fast pace, utilizing computerized technologies helps managers make fact-based decisions to support business operations. This course provides an introduction to the use of business intelligence and data visualization in organizations, with emphasis on how data is gathered, stored, analyzed, and used. Topics covered include business intelligence, data warehousing, data visualization, and business reporting. Previously BUAN 4310.

DATA 4315 Data Mining and Applications 3 Credits

Prerequisites: DATA 3210, DATA 3260.

This course provides students with a practical understanding of data mining, applications, techniques, and tools, with a specific focus on business analytics. The pillars of the data mining process (data collection/extraction and mining) are demonstrated with real world examples. Applications of these techniques and tools to different areas are covered. A semester-wide team project provides students with hands-on experience to bring together data mining concepts learned. Previously IS 0315, BUAN 4315.

DATA 4999 Business Analytics Capstone 3 Credits

Prerequisite: Senior standing.

This course is the capstone for the business analytics major. Students collaborate on different types of analytical projects of varying scope and complexity. Each student acquires and applies specialized technical and managerial expertise as required for completing the projects. The capstone projects will be real-world, client-oriented, and faculty-guided applications. Supplementary instruction in analytical project design, development, and evaluation is provided on an as-needed basis within the context of the project work. Previously IS 0395, BUAN 4999.

DATA 5400 Applied Business Statistics 3 Credits

Using spreadsheet software, this hands-on course teaches a variety of quantitative methods for analyzing data to help make decisions. Topics include: data presentation and communication, probability distributions, sampling, hypothesis testing and regression, and time series analysis. This course uses numerous case studies and examples from finance, marketing, operations, accounting, and other areas of business to illustrate the realistic use of statistical methods. Previously QA 0400, BUAN 5400.

DATA 5405 Python Fundamentals 3 Credits

This course is an introduction to Python, with an emphasis on general programming concepts (structure, logic, data, etc.) that apply to just about any general purpose programming language. Starting with a review of fundamental programming concepts, the course uses short lessons, quizzes, and coding challenges to cover the basics of how Python is used in a professional Business Analytics setting. The course concludes with a final project designed to demonstrate proficiency. Previously BA 0405, BUAN 5405.

DATA 5410 Analytics Programming for Business 1.5 Credits

This course focuses on quantitative modeling and analyzing business problems using spreadsheet software, such as Excel and its add-ins. Topics include descriptive analytics, visualizing and exploring data, predictive modeling, regression analysis, time series analysis, portfolio decisions, risk management, and simulation. Business models relevant to finance, accounting, marketing, and operations management are set up and solved, with managerial interpretations and "what if" analyses to provide further insight into real business problems and solutions. Open to MS Management students only. Previously BA 0410, BUAN 5410.

DATA 6100 Fundamentals of Analytics 3 Credits

This is an introductory level graduate course focusing on spreadsheet modeling to analyze and solve business problems. Topics include descriptive analytics, data visualization, predictive modeling, time series analysis, and data mining. Contemporary analytical models utilized in finance, marketing, accounting, and management are set up and solved through case studies. Previously IS 0500, ISOM 6500.

DATA 6500 Business Analytics 3 Credits

This course introduces basic skills necessary for business analytics such as data analysis using basic statistics, data visualization and summarization, descriptive and inferential statistics, spreadsheet modeling for prediction, linear regression, risk analysis using Monte-Carlo simulation, linear and nonlinear optimization, and decision analysis. Microsoft Excel is used as the platform for conducting analyses and performing statistical calculations. Previously BA 0500, BUAN 6500.

DATA 6505 Python for Business Analytics 3 Credits

Prerequisite: DATA 5405 or placement exam.

In this course, we introduce Python as a language and tool for collecting, preprocessing, and visualizing data for business analytics. Since Python is one of the most popular programming languages, along with R, in data mining and business analytics, its fundamental programming logic and knowledge is essential for students to apply in data mining and to succeed in the job market. Specifically, this course focuses on the data-engineering phase, which includes collecting, preprocessing, and visualizing data, with respect to applications in business modeling, optimization, and statistical analysis. In addition, a number of mini projects will be used as vehicles to cover the main applications of data analytics, including recommender systems, text analytics, and web analytics. Previously BA 0505, BUAN 6505.

DATA 6510 Databases for Business Analytics 3 Credits

This course introduces databases and data management in three parts. The first part covers basic database fundamentals. The second part is a hands-on introduction to Structured Query Language (SQL) for defining, manipulating, accessing, and managing data, accompanied by the basics of data modeling and normalization needed to ensure data integrity. The course concludes with a comprehensive database project that gives each student the opportunity to integrate and apply the new knowledge and skills learned from this class. Advanced topics such as distributed database systems, data services, and NoSQL databases are also discussed. Previously BA 0510, BUAN 6510.

DATA 6530 Business Forecasting and Predictive Analytics 3 Credits

Prerequisite: DATA 5400 or placement exam.

This course introduces analytical techniques used for decision-making under uncertainty. Topics include time series and other forecasting techniques, such as Monte Carlo simulation, to assess the risk associated with managerial decisions. Specifically, we will cover data collection methods, time dependent models and analysis, advanced solver, time series techniques, exponential smoothing, moving averages, and Box-Jenkins (ARIMA) models. Application examples include financial models - stock prices, risk management - bond ratings, behavior models - customer attrition, customer likes/dislikes, buying patterns - propensity to buy, politics - identify swing voters, and sales. Previously QA 0500, BUAN 6530.

DATA 6535 Advanced Sports Analytics 3 Credits

Sports analytics is transforming the way teams, leagues, players, coaches, referees, and fans perceive and appreciate their favorite pastimes and games, including major team sports such as baseball, basketball, football, soccer, cricket, and rugby, more individualized sports like tennis and golf, and brand-new innovations such as e-sports. In this course, students will gain experience in framing analytical questions in sports, discover and evaluate cutting-edge research and findings in sports analytics, develop hands-on skills in using and implementing sports analytics solutions, and learn how to communicate findings to a non-analytical audience in an impactful and actionable way. This course culminates in a scholarly sports analytics research paper.

DATA 6540 Business Intelligence 3 Credits

Prerequisites: DATA 6500, DATA 6510.

This course will change the way students think about data and its role in business. Increasingly, managers rely on intelligent technology to systematically analyze data to improve their decision-making. In many cases, automating analytical and decision-making processes is necessary because of the large volume of data and the speed with which new data are generated. In this course, we will examine how data warehousing, modeling, and visualization can be used to improve managerial decision making. Previously BA 0540, BUAN 6540.

DATA 6545 Machine Learning for Predictive Analytics 3 Credits

Prerequisites: DATA 6505, DATA 6530.

This course provides an advanced understanding of the practices of machine learning techniques, with a special focus on business applications. To assure practical relevance, the emphasis of this course is on the applications of techniques and tools realizing machine learning in terms of business analytics. The course is organized following the Cross-Industry Standard Process for Data Mining (CRISP-DM) and all learned techniques are applied in a semester-wide project. Python is introduced and illustrated through a series of tutorials and case studies. Students are expected to actively participate in the course deliverables through independent assignments, lab work, and group projects. Previously BA 0545, BUAN 6545.

DATA 6999 Capstone: Business Analytics Applications 3 Credits

Prerequisites: DATA 6530, DATA 6540, DATA 6545.

This capstone course for the MS Business Analytics program is to be taken in the last term before graduation. The purpose is to apply and integrate knowledge and skills learned in the program (statistics, modeling, data management, data mining, etc.) to a live data analytics project. The course is project-based, with students collaborating on their work under the guidance of faculty members. Application areas and format of the projects may vary, depending on faculty, dataset, and budget availability. However, the work should be rich enough to demonstrate mastery of business modeling and technology, with each student making a unique, demonstrable contribution to completion of the work. Previously BA 0590, BUAN 6999.