

BAX - Business Analytics

Business Analytics: BAX

Lower-Division Courses

BAX 304. Introduction to Problem Solving and Programming.

Same as Management Information Systems 304. Restricted to students in the McCombs School of Business. Programming skills for creating easy-to-maintain systems for business applications. Object-oriented and structured methodologies with Python. Three lecture hours a week for one semester. Only one of the following may be counted: Business Analytics 304, 305, or Management Information Systems 304. Offered on the letter-grade basis only.

BAX 305. Programming for Data Analytics.

Restricted to students in the McCombs School of Business. Examine general principles of computer languages and basic object-oriented programming principles. Translate business problems from English into programs written using the Python language. Explore automatic function optimization needed for decision-making. Utilize Python for hands-on work. Three lecture hours a week for one semester. Only one of the following may be counted: Business Analytics 304, 305, or Management Information Systems 304.

BAX 119S, 219S, 319S, 419S, 519S, 619S, 719S, 819S, 919S. Topics in Business Analytics.

This course is used to record credit the student earns while enrolled at another institution in a program administered by the University's Study Abroad Office. Credit is recorded as assigned by the study abroad advisor in the academic unit. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. Transfer credit is awarded for work in an affiliated studies program. May be repeated for credit when the topics vary.

Upper-Division Courses

BAX 325. Database Management.

Same as Management Information Systems 325. Restricted to students in the McCombs School of Business. Beginning and intermediate topics in data modeling for relational database management systems. Three lecture hours a week for one semester. Only one of the following may be counted: Business Analytics 325, 327, or Management Information Systems 325. Offered on the letter-grade basis only.

BAX 327. Data Management.

Restricted to students in the McCombs School of Business. Explore how to tailor data strategy to business strategy and the technical skills related to understanding data sources, acquiring data, storing data efficiently, and processing the data in preparation for analysis. Learn how to engineer and manage data pipelines, create data stores for analytics, and use data management specific APIs (application programming interfaces). Examine the importance of implementing data governance, understanding data limitations, and assessing the fairness of data collection and usage. Three lecture hours a week for one semester. Only one of the following may be counted: Business Analytics 325, 327, Management Information Systems 325.

BAX 129S, 229S, 329S, 429S, 529S, 629S, 729S, 829S, 929S. Topics in Business Analytics.

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advisor in the academic unit. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. Transfer credit is awarded for work in an affiliated studies program. May be repeated for credit when the topics vary.

BAX 338. Supply Chain Modeling and Optimization.

Same as Operations Management 338. Restricted to students in a business major. Framing, formulating, and applying quantitative optimization and descriptive models to support supply chain and operations management decisions, using spreadsheets and other software. Requires familiarity with spreadsheets. Three lecture hours a week for one semester. Only one of the following may be counted: Operations Management 337 (Topic 2), 338, Business Analytics 338. Offered on the letter-grade basis only. Prerequisite: Operations Management 334M, 235, or 235H.

BAX 357. Predictive Analytics.

Restricted to students in the McCombs School of Business. Introduction to machine learning and artificial intelligence techniques with a focus on business applications and decision-making. Examine predictive frameworks, including tree-based techniques and artificial neural networks and their applications in business contexts. Explore solid foundations for evaluating models to understand their impact in a given business context, discuss issues related to algorithmic decision-making, and algorithmic bias and fairness. Three lecture hours a week for one semester. Only one of the following may be counted: Business Analytics 357, 372 (Topic 2), Management Information Systems 373 (Topic 17), Marketing 372 (Topic: Predictive Analytics and Data Mining), 372 (Topic 22). Offered on the letter-grade basis only. Prerequisite: Upper-division standing; Statistics 301, 301H, 309, or 309H; and Business Analytics 304, 305, or Management Information Systems 304.

BAX 358. Optimization Methods and Decision Making.

Restricted to students in the McCombs School of Business. Examine decision-making in deterministic settings. Discuss optimization and planning in various contexts including portfolio selection, production planning, marketing allocations, revenue management and pricing. Explore linear, quadratic, nonlinear, and integer programming. Utilize Python for hands-on work. Three lecture hours a week for one semester. Prerequisite: Upper-division standing; Business Analytics 304, 305, or Management Information Systems 304; and one of the following: Statistics 235 and Decision Sciences 235, or Statistics 371G, or Statistics 371H.

BAX 360, 460. Information and Analysis.

Same as Marketing 360. Same as Marketing 460. Restricted to students in a business major. The development and analysis of information for marketing management sources. For each semester hour of credit earned, one lecture hour a week for one semester. Marketing 360, 460 and Business Analytics 360, 460 may not both be counted. Prerequisite: Marketing 337 or 337H, and Statistics 301, 301H, 309 or 309H.

BAX 362. Auditing and Control.

Same as Accounting 362. Restricted to students in a business major. Professional practice standards and procedures of auditing: ethics, legal liability, sampling methods, control systems, control design, and control evaluation. Three lecture hours a week for one semester. Only one of the following may be counted: Accounting 358C, 362, 380K (Topic 4), Business Analytics 362. Prerequisite: Accounting 311 or 311H, and 312 or 312H, with a grade of at least C- in each.

BAX 365. Ethics of Business Analytics.

Restricted to students in a business major. Analyze the ethical questions and implications of applying data science to business problems. Examine ethical, policy, and legal terminology used to conceptualize

challenges. Explore technical approaches to characterize ethical problems, and historical cases and recent controversies involving data science ethics. Discuss data as abstraction and representations, data collection, consent and privacy, bias in predictive modeling, and algorithms as actors and feedback loops. Three lecture hours a week for one semester.

BAX 366. Advanced Programming for Data Analytics.

Restricted to students in a business major. Study exploratory data analysis in-depth. Examine machine learning approaches such as classification and clustering, with a focus on practical implementation of machine learning projects. Explore tools for extraction of structured data and methods for analyzing data networks. Utilize Python for hands-on work. Three lecture hours a week for one semester.

BAX 366P. Business Analytics Practicum.

Restricted to students in a business major. Apply skills in a major area and focus on additional business analytics skills through group projects conducted in a professional setting. Work with a private or a public enterprise. Three lecture hours a week for one semester. Prerequisite: A minimum of forty-five semester hours of college coursework.

BAX 367. Advanced Predictive Analytics.

Restricted to students in a business major. Explore problem formulation, data understanding and preparation, and class imbalance and biases in observed and unobserved information. Examine predictive frameworks such as network and graph data analysis, unstructured data analysis, and subjects related to deep neural network architectures and their business applications. Three lecture hours a week for one semester.

BAX 368. Advanced Optimization Methods and Decision Making.

Restricted to students in a business major. Examine decision-making under uncertainty. Discuss optimization and planning in various contexts including queueing, resource allocation, pricing, inventory management, and artificial intelligence. Explore stochastic optimization, sample average approximations, simulation, and sequential decision making. Utilize Python for hands-on work. Three lecture hours a week for one semester.

BAX 372. Topics in Business Analytics.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Varies with the topic.

Topic 1: Advanced Analytics Programming. Restricted to students in a business major. Focuses hands-on data analysis using the Python programming language. Subjects include machine learning tasks such as classification and clustering. Only one of the following may be counted: Management Information Systems 373 (Topic: Advanced Analytics Programming), 373 (Topic 11), Business Analytics 372 (Topic 1). Additional prerequisite: Business Analytics 304, 305, or Management Information Systems 304 with a grade of at least C-.

Topic 2: Predictive Analytics and Data Mining. Introduces the data mining process and primary data mining techniques employed to extract intelligence from data and evaluates the strengths and weaknesses of data mining techniques applied to challenges in various business domains. Only one of the following may be counted: Business Analytics 357, 372 (Topic 2), Management Information Systems 373 (Topic 17), Marketing 372 (Topic: Predictive Analytics and Data Mining), 372 (Topic 22). Additional prerequisite: Statistics 301, 301H, 309 or 309H.

Topic 4: User Generated Content Analytics. Restricted to students in a business major. Designed to showcase the virtually unlimited opportunities that exist today to leverage the power of user generated content analytics. Focuses on a gamut of questions ranging

from strategic to op Only one of the following may be counted: Management Information Systems 373 (Topic: User Generated Content Analytics), 373 (Topic 25), Business Analytics 372 (Topic 4).
Topic 5: Financial Technology. Restricted to business majors. Explore an overview of the most recent technological advances that are changing the financial services industry and how these technological breakthroughs offer new ways for people to save, invest, borrow, and transact. Analyze how new technologies create value in the financial industry, from reducing unit cost, increasing transparency, increasing competition, creating network effects, leveraging economies of scales, and lowering asymmetric information. Examine the competitive landscape and the market opportunities and threats for incumbents and new entrants. Only one of the following may be counted: Finance 372 (Topic: Financial Technology), 372 (Topic 5), Business Analytics 372 (Topic 5).

Topic 6: Optimization Method in Finance. Same as Decision Science 372 (Topic 6). Explore quantitative methods and techniques in optimization and simulation, and their use in financial decision making. Discuss theory and application in portfolio selection, options and other derivative pricing, index tracking, risk measures, volatility estimating. Examine linear, quadratic, nonlinear, and integer programming; dynamic programming; robust optimization; Monte Carlo methods and variance reduction techniques. Emphasis will be placed on problem solving with advanced computational programming languages. Only one of the following may be counted: Finance 372 (Topic: Optimization Method in Finance), 372 (Topic 6), Statistics 372 (Topic 6), Business Analytics 372 (Topic 6), Decision Science 372 (Topic 6).

Topic 7: People Analytics. Restricted to students in a business major. Explore the use of analytics in the creation and management of human capital. Examine the recruiting, selecting, deploying, developing and managing performance of employees. Only one of the following may be counted: Management 337 (Topic: People Analytics), 337 (Topic 7), Business Analytics 372 (Topic 7).

Topic 8: Pricing and Channels. Restricted to students in a business major. Explore the concepts, theory and latest thinking bearing on the key issues in pricing and channels, taking the perspective of the marketing manager. Apply concepts and theory, through extensive case analyses and multiple assignments, to the solution of pricing and channel problems in realistic business settings. Only one of the following may be counted: Marketing 372 (Topic: Pricing and Channels), 372 (Topic 14), Business Analytics (Topic 8).

Topic 9: Data Analytics for Marketing. Introduction to the world of making more effective marketing decisions through the use of data. Examine sources of data, methods of collecting and cleaning the data, analyzing the data, and finally presenting the data in meaningful and impactful ways. Use real-world data and applications from a variety of industries, the objective is to assist in familiarizing with the empirical and analytical tools needed to make effective marketing decisions in the age of large and plentiful datasets. Only one of the following may be counted: Marketing 372 (Topic: Data Analytics for Marketing), 372 (Topic 23), Business Analytics 372 (Topic 9).

Topic 10: Data Driven Marketing. Explore marketing research analytics using various types of data analytics and statistical learning modes. Only one of the following may be counted: Marketing 372 (Topic: Data Driven Marketing), 372 (Topic 25), Business Analytics 372 (Topic 10).

Topic 14: Quantitative Investment Management. Restricted to students in a business major. Examine the economic, statistical, and computing frameworks behind quantitative approaches to evaluating and implementing investment strategies, as well as the empirical evidence on their performance in multiple asset classes. Apply the quantitative big-data approach by developing, pitching, and backtesting an original trading strategy. Only one of the following may be counted: Business Analytics 372 (Topic 14), Finance 372

(Topic: Quant Investment Management), 372 (Topic 4). Additional prerequisite: Finance 367.

Topic 16: Supply Chain Analytics. Restricted to students in a business major. Study dynamic demand forecasting models based on both data aggregation as well as hierarchical aggregation of point-of-sale predictive analytics. Explore the use of developed predictive dynamic models for operations planning and operations decision making. Only one of the following may be counted: Operations Management 337 (Topic: Supply Chain Analytics), 337 (Topic 6), Business Analytics 372 (Topic 16). Additional prerequisite: Credit or registration for Operations Management 334M, 235 or 235H.

Topic 17: Health Care Analytics. Restricted to students in a business major. Explore key management challenges and how data may be leveraged to guide decisions and improve operations, with the unifying theme of providing health care services in a manner that leads to lower cost and higher quality. Only one of the following may be counted: Management Information Systems 373 (Topic: Healthcare Analytics), 373 (Topic 26), Operations Management 337 (Topic: Healthcare Analytics), 337 (Topic 8), Business Analytics 372 (Topic 17).

Topic 21: Time Series Forecasting. Restricted to students in the McCombs School of Business. Examine statistical forecasting methods used in business. Discuss Box-Jenkins models; exponential smoothing models; ARCH/GARCH models for varying volatility in financial returns; seasonal adjustment of time series; tests for nonstationarity of time series; and modeling multiple time series. Only one of the following may be counted: Statistics 372 (Topic 5), 372 (Topic 8), 372 (Topic 9), Business Analytics 372 (Topic 20), or 372 (Topic 21). Additional prerequisite: Statistics 235, 235H, 371G, 371H or Statistics and Data Sciences 358 or Economics 341K; or other course with basic knowledge about regression.

Topic 23: Social Media Analytics. Restricted to students in a business major. Introduction to social network analysis for business value using statistical optimization and decision theory; and foundation for analyzing online search and conversation data for market sensing, sentiments, product quality, reputation, recommendations, and brand awareness. Management Information Systems 373 (Topic 23) and Business Analytics 372 (Topic 23) may not both be counted.

BAX 375. Business Analytics in Practice.

Restricted to students in a business major. Examine the role of business analytics in the context of the broader operations of a firm. Explore the use of business analytics in firms, the impact on business performance, and the ways that it can enhance firm value, through a series of case studies. Three lecture hours a week for one semester. Prerequisite: Senior standing; Business Analytics 304, 305, or Management Information Systems 304; credit or registration for Business Analytics 357, 358, and one of the following: Business Administration 353, 366P, Accounting 366P, Business Analytics 366P, International Business 366P, Finance 364P, 365P, 366P, Management 347P, 366P, 367P, 369P, Management Information Systems 366P, Marketing 366P, or Operations Management 366P.

Graduate Courses

Professional Courses