

Business Analytics (BAX)

BAX 304 Introduction to Problem Solving and Programming 3 Hours
Programming skills for creating easy-to-maintain systems for business applications. Object-oriented and structured methodologies with Python.

BAX 305 Programming for Data Analytics 3 Hours
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.

BAX 119S, 219S, 319S, 419S, 519S, 619S, 719S, 819S, 919S Topics in Business Analytics 1-9 Hours
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.

BAX 320F Foundations of Business Analytics 3 Hours

BAX 325 Database Management 3 Hours
Beginning and intermediate topics in data modeling for relational database management systems.

BAX 327 Data Management 3 Hours
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.

BAX 129S, 229S, 329S, 429S, 529S, 629S, 729S, 829S, 929S Topics in Business Analytics 1-9 Hours
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BAX 332F Topics in Foundations of Business Analytics 3 Hours

BAX 338 Supply Chain Modeling and Optimization 3 Hours
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.

BAX 357 Predictive Analytics 3 Hours
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.

BAX 358 Optimization Methods and Decision Making 3 Hours
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.

BAX 360, 460 Information and Analysis 3-4 Hours
The development and analysis of information for marketing management sources.

BAX 362 Auditing and Control 3 Hours
Professional practice standards and procedures of auditing: ethics, legal liability, sampling methods, control systems, control design, and control evaluation.

BAX 365 Ethics of Business Analytics 3 Hours
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.

BAX 366 Advanced Programming for Data Analytics 3 Hours
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.

BAX 366P Business Analytics Practicum 3 Hours
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.

BAX 367 Advanced Predictive Analytics 3 Hours
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.

BAX 368 Advanced Optimization Methods and Decision Making 3 Hours
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.

BAX 171T Topics in Business Analytics 1 Hour

BAX 372T Topics in Business Analytics 3 Hours

BAX 372T.11 Advanced Analytics Programming 3 Hours
Focus on data analysis using the Python programming language. Explore machine learning tasks such as classification and clustering.

BAX 372T.13 Data Driven Marketing 3 Hours
Explore marketing research analytics using various types of data analytics and statistical learning modes.

BAX 372T.14 Quantitative Investment Management 3 Hours
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.

BAX 372T.15 Financial Technology 3 Hours

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.

BAX 372T.16 Optimization Method in Finance 3 Hours

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.

BAX 372T.17 Health Care Analytics 3 Hours

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.

BAX 372T.18 People Analytics 3 Hours

Explore the use of analytics in the creation and management of human capital. Examine recruiting, selecting, deploying, developing, and managing performance of employees.

BAX 372T.19 Pricing and Channels 3 Hours

Explore the concept, theory, and latest thinking that bares on key issues in pricing and channels; taking the perspective of the marketing manager. Apply concepts and theory, through extensive case analyses, to solve pricing and channel problems in realistic business settings.

BAX 372T.20 Supply Chain Analytics 3 Hours

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.

BAX 372T.21 Time Series Forecasting 3 Hours

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 nonstationary of time series; and modeling multiple time series.

BAX 372T.22 Predictive Analytics and Data Mining 3 Hours

Introduction to data mining problems and tools to enhance managerial decision making at all levels of the organization. Discuss scenarios, including the use of data mining to support customer relationship management (CRM) decisions, decisions in the entertainment industry, financial trading, and even professional sports teams.

BAX 372T.23 Social Media Analytics 3 Hours

Introduction to social network analysis for business value using statistical optimization and decision theory. Analyze online search and conversation data for market sensing, sentiments, product quality, reputation, recommendations, and brand awareness.

BAX 372T.24 Data-Driven Revenue Management 3 Hours

Use data-driven tactics and strategies to predict consumer demand and optimize price and capacity/inventory availability to maximize revenue or profit. Explore demand analytics and revenue management techniques, produce rigorous and practical insights, and develop data analysis and optimization skills, based on business cases, datasets, and exercises. Examine diverse contexts and industries, such as conventional retailing, e-commerce, airline/hotel, and contemporary platform and cloud services (e.g., Uber, Dropbox, Netflix, AWS), by utilizing software (Excel, R, or Python) to build models, conduct optimization, and develop insights for a variety of revenue management examples.

BAX 372T.25 User Generated Content Analytics 3 Hours

Focus on a gamut of questions ranging from strategic to operational matters pertaining to a firm's social media initiatives, metrics to capture relevant outcomes, and predictive analysis to link social media chatter to business performance.

BAX 372T.26 Data Analytics for Marketing 3 Hours

Introduction to making more effective marketing decisions through the use of data. Examine sources, collecting and cleansing methods, conducting analyses, and presenting of data. Use real-world data and applications from a variety of industries.

BAX 375 Business Analytics in Practice 3 Hours

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.