

BUSINESS ANALYTICS (ANL)

ANL 301. Business Analytics. 3 Credit Hours.

This course introduces quantitative modeling and analysis. The course includes applications from different disciplines of business including finance, marketing, information systems, and operations. The course focuses on diagnosing and solving business problems based on quantitative analysis. Modeling methods and techniques are introduced in the context of specific business situations. These techniques include forecasting, optimization, project management, supply chain management and planning, and system simulation.
Prerequisite: STA 201.

ANL 310. Analytics for Social Good. 3 Credit Hours.

This course is designed to help students use analytical skills to address important issues in areas like healthcare, disaster relief, food rescue, ethical use of data, and fair resource allocation. It explores the core of analytics and its potential to bring about positive change. The curriculum covers various analytics applications, showing how data-driven insights can be applied to solve humanitarian challenges. The course provides a foundation for using analytics for social good, starting with basic principles and concepts like data gathering, cleaning, visualization, predictive modeling, machine learning, optimization, geospatial analytics, and ethical considerations. The course emphasizes hands-on learning with real-world case studies, demonstrating the value of data analytics for social causes. Students will gain practical experience using Excel and Python.
Prerequisite: MTH 110 and MTH 112 OR STA 201 and STA 202.

ANL 400. Applied Forecasting Analysis. 3 Credit Hours.

This course provides techniques for the parsimonious description of univariate and multivariate time-ordered data. Various models are discussed, including Box-Jenkins models, for purposes of inference, estimation, and prediction. Techniques of analysis are illustrated using actual data sets with emphasis on using the computer as an exploratory tool.
Prerequisite: STA 202 and ANL 301, or permission of instructor.

ANL 410. Supply Chain Analysis. 3 Credit Hours.

Industrial supply chains are integral part of contemporary business practices. This course will examine key issues related to the design and management of supply chains. It will include discussions on the integration of various parts of the supply chain including suppliers, factories, distribution centers, warehouses and retailers. Theories related to the efficient distribution of products to customers will be introduced. Also, management techniques addressing tradeoffs between cost and service will be discussed. Much of the course concepts will be covered through case studies and simulations.
Prerequisites: STA 202 or MTH 112, and ANL 301.

ANL 415. Business Intelligence. 3 Credit Hours.

This course provides an introduction to Business Intelligence, including the processes, methodologies, infrastructure, and current practices used to transform business data into useful information and support business decision-making. Business Intelligence requires foundation knowledge in data storage and retrieval, thus this course will review logical data models for both database management systems and data warehouses. Students will learn to extract and manipulate data from these systems and assess security-related issues. Data mining, visualization, and statistical analysis along with reporting options such as management dashboards and balanced scorecards will be covered. Technologies utilized in the course included SAP Business Warehouse, SAP Business Objects, Crystal Reports, and RapidMiner.
Prerequisite: MIS 201 or permission of the instructor.

Cross-listed Courses: MIS 415, MKT 415, CTS 415

ANL 420. Strategic Management Analysis. 3 Credit Hours.

Management science analyses are the basis of many successful strategic decisions. This course introduces many of the management science techniques in the context of strategic decision making. These techniques include linear programming, transportation, decision theory, queuing theory, and simulation. The course entails analyzing cases from all business disciplines and evaluating various strategic decisions within the framework of these cases.
Prerequisites: STA 202 and ANL 301.

ANL 425. Marketing Analytics. 3 Credit Hours.

With the increased use of big data creating a paradigm shift in how marketers make decisions, the need to be able to extract meaningful information from this voluminous amount of data to make smarter decisions is becoming more important than ever. The course will provide students with the tools to develop a systematic, analytical approach to marketing decision making. The course aims at preparing students to (1) understand the value of competitive advantages leveraged by analytics; (2) understand the existence, advantages and limitations of different analytical approaches; and (3) to apply, interpret the input, and communicate the output from these tools and models, and apply them to help make fact-based decisions. The course takes on a hands-on experiential approach with real-world databases to facilitate the comprehension of the different analytical approaches discussed in class.
Prerequisites: MKT 301, STA 202.

Cross-listed Courses: MKT 420, MIS 420

ANL 430. Simulation and Risk Analysis. 3 Credit Hours.

This course is designed to provide students with basic understanding of concepts of simulation and provide them the opportunity to design several simulations for various applications (including fun and games). Methodologies are introduced in the context of financial and operations applications and include techniques for risk analysis. Models will include both event and process simulations. Simulation software packages are introduced as tools for problem solving.
Prerequisites: STA 202 and ANL 301.

ANL 435. Data Science. 3 Credit Hours.

This course will provide you the knowledge and techniques to approach phenomena analytically. Specially, you will learn the role and process of the data science lifecycle in understanding and gaining insight about phenomena, including how to ask the appropriate questions, identify the appropriate data and information needed, use the appropriate tools to analyze a large volume of data, evaluate the findings effectively with parameters, find the appropriate answers, and present the answers and compellingly. In the business context such knowledge can enable organizations to make quality decisions and develop important business strategies that can enhance organizational performance and that can contribute to significant financial gains. You will proficiently acquire such knowledge and techniques through class discussion, lectures, readings, as well as hand-on exercises. Prerequisite(s): STA 202 or MTH 112. Cross-listed Courses: MIS 340, CTS 340

ANL 440. Machine Learning for Business Applications. 3 Credit Hours.

Machine learning, a subset of artificial intelligence, gives computers the capability to learn from data, identify patterns, and make decisions without being explicitly programmed. This course will cover different supervised and unsupervised machine learning algorithms, and their applications to structured and unstructured data including financial, marketing, health care, social media, entertainment, and socio-economic data. Four main problem domains will be covered (i) regression, (ii) classification, (iii) clustering, and (iv) association. Using machine learning to transform data into business decisions and communication of the results and insights from the analysis will be emphasized throughout the course. This course does not assume any prior exposure to machine learning theory or practice. Prerequisite(s): ANL 301 and STA 202, or permission of department chair. Cross-listed Courses: MIS 440

ANL 600. Fundamentals of Business Analytics. 3 Credit Hours.

Business analytics is the process of examining data to gain insights and inform decisions in organizations. It can be applied in operations, marketing, finance, and strategic planning, among other functions. This course provides students with an introduction to fundamental business analytics concepts and methods. Topics include data wrangling, data visualization, descriptive measures, regression models, time series forecasting, data mining, simulation, and optimization. The course highlights the practical aspect of business analytics and aims to help students identify opportunities to utilize these techniques for improving performance and supporting decision-making. The course features case studies and hands-on approaches to demonstrate the value of business analytics in organizations. The course introduces Excel, Tableau, R, and Python for data analysis and modeling. Prerequisite: STA 501 or approval of the department chair.

ANL 601. Supply Chain Management. 3 Credit Hours.

This course provides the analytical experience for modeling manufacturing and service systems, and the understanding of how they utilize limited resources to provide goods and services. The course introduces students to different quantitative techniques and decision-making approaches and their applications to operations management problems. The problem-solving approach also involves the use of several personal computer packages containing management science and operations research programs. Topics include forecasting, facility layout, production processes, planning, scheduling, resource allocation, inventory systems, project management, decision analysis and quality control. Recommended prerequisites: STA 501 and MIS 501.

ANL 701. Forecasting. 3 Credit Hours.

This course provides techniques for the parsimonious description of univariate time-ordered data. Various models are discussed for purposes of estimation and predication, including Box-Jenkins models, dynamic regression models, and other selected models in multivariate time series analysis and forecasting. Techniques of analysis are illustrated using actual data sets with emphasis on using the computer as an exploratory tool. Prerequisite: ANL 601.

ANL 702. Cases in Business Analytics. 3 Credit Hours.

This course is designed to provide students with problem-solving skills in the field of quantitative management. The case approach is adopted to introduce complex real life examples to student-teams in a competitive environment. The course also introduces theoretical grounds for some analytical models emphasizing the assumptions and limitations of these models. The assigned cases include applications of regression, networking, linear programming, PERT, queuing theory, decision making under uncertainty and simulation. The students are required to use available computer packages as problem-solving tools and are encouraged to conduct sensitivity (what-if) analysis in their decision making approaches. Prerequisite: ANL 601.

Cross-listed Courses: MIS 702

ANL 705. Advanced Business Analytics. 3 Credit Hours.

Data is useful if relevant and insightful information can be extracted from it to better understand the past (descriptive analytics), anticipate future events (predictive analytics), and direct the course of the best decision (prescriptive analytics). This course will cover different supervised and unsupervised machine learning algorithms, and their applications to structured and unstructured data including financial marketing, health care, social media, entertainment, and socio-economic data. Effective communication of the results and insights from the analysis, including via well-designed visualizations will be emphasized throughout the course. This course does not assume any prior exposure to machine learning theory or practice. Prerequisite: ANL 601.

Cross-listed Courses: MIS 705

ANL 716. Business Intelligence. 3 Credit Hours.

This course provides an introduction to Business Intelligence, including the processes, methodologies, infrastructure, and current practices used to transform business data into useful information and support business decision-making. Business Intelligence requires foundation knowledge in data storage and retrieval, thus this course will review logical data models for both database management systems and data warehouses. Students will learn to extract and manipulate data from these systems and assess security-related issues. Data mining, visualization, and statistical analysis along with reporting options such as management dashboards and balanced scorecards will be covered. Technologies utilized in the course included SAP Business Warehouse, SAP Business Objects, Crystal Reports, and RapidMiner. Prerequisite: MIS 501 or permission of the instructor.

Cross-listed Courses: MIS 716

ANL 719. Marketing Analytics. 3 Credit Hours.

In a world where data is more valuable than oil, the need to apply cutting-edge computational analyses, in addition to conventional statistical approaches, to derive meaning from large noisy databases and provide insight into understanding the outcome of marketing strategies is becoming more important than ever. This course will teach students how to leverage data and use analytics to form impactful marketing strategies. By learning the different analytical approaches and how to apply them to make marketing decisions, students enhance their understanding of the importance of marketing analytics.

Prerequisites: MKT 601, STA 501, and MIS 501.

Cross-listed Courses: MKT 719, MIS 719

ANL 720. Cases in Business Analytics. 3 Credit Hours.

This course is designed to provide students with problem-solving skills in the field of quantitative management. The case approach is adopted to introduce complex real-life examples to student-teams in a competitive environment. The course also introduces theoretical grounds for some analytical models emphasizing the assumptions and limitations of these models. The assigned cases include applications of simulation. The students are required to use available computer packages as problem-solving tools and are encouraged to conduct sensitivity (what-if) analysis in their decision-making approaches.

Prerequisite: ANL 601.

ANL 730. Forensic Analytics. 3 Credit Hours.

This course examines the nature of occupational fraud and abuse in organizations. Students will learn how and why occupational fraud is committed, how fraud can be detected, how fraud can be deterred, and how to proceed if fraud is suspected. Emphasis is placed on asset misappropriation schemes, corruption, and financial statement fraud. Students will also learn how "big data" and the use of analytic techniques have changed fraud detection, investigation, and prevention.

Cross-listed Courses: ACT 730

ANL 740. Data Science. 3 Credit Hours.

This course will provide you the knowledge and techniques to approach phenomena analytically. Specially, you will learn the role and process of the data science lifecycle in understanding and gaining insight about phenomena, including how to ask the appropriate questions, identify the appropriate data and information needed, use the appropriate tools to analyze a large volume of data, evaluate the findings effectively with parameters, find the appropriate answers, and present the answers and compellingly. In the business context such knowledge can enable organizations to make quality decisions and develop important business strategies that can enhance organizational performance and that can contribute to significant financial gains. You will proficiently acquire such knowledge and techniques through class discussion, lectures, readings, as well as hand-on exercises. Prerequisite(s): STA 501.

Cross-listed Courses: MIS 740

ANL 790. Special Topics in Business Analytics. 3 Credit Hours.

Courses in this series offer an in-depth exploration of specific issues within the field of operations management, as well as topics of current interest to students and instructors.

ANL 799. Strategic Analytics. 3 Credit Hours.

Strategic Analytics calls for viewing organizations as a whole and as entities adapting to and acting upon their external environments. Understanding external environments, articulating an inspiring mission, developing an appreciation for, and building new, capabilities are critical to the formulation of strategies that will succeed on the national and global levels. The content and process of the capstone course have been designed to provide a rigorous, integrative experience in analytics theories in a variety of environments. Through lectures and discussions of articles, students are exposed to seminal theory on analytics. In addition, leadership specific, integrative thinking and communication skills are developed throughout the discussions of the articles and cases. This course is project based. Students will develop an organizational strategy based on the knowledge they obtained from their ANL courses, for an organization.

Prerequisite: ANL 601.