**Business Analytics**

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Business analytics is the discipline of applying quantitative analytical models to convert data into useful information to help make better business decisions. Business analytics consists of descriptive analytics (analyzing what has happened in the past), predictive analytics (predicting what could happen in the future), and prescriptive analytics (prescribing optimal actions that will result in the best outcomes).

The business analytics major introduces students to quantitative modeling and analysis. Students learn methods and techniques in the context of diagnosing and solving problems from different disciplines of business including finance, marketing, information systems, and operations. A dual major in business analytics and either finance, information systems or marketing is available for those students who wish to complement their analytical skills with focused studies in these disciplines. Classes are held in a computer lab to provide hands-on real world experience in the art of modeling and analysis.

**Student Learning Outcomes in Business Analytics**

**Basic Modeling Skills**
Graduates will develop basic skills associated with building analytical models which support problem solving and decision making. These will include descriptive, predictive, and prescriptive analytical methodologies.

**Applying Analytical Models in a Specific Applied Context**
Graduates will develop the ability to apply basic analytical skills to solve problems in a functional business area. This will include the ability to identify necessary data, select and apply an analytical modeling technique, and make an appropriate recommendation.

**Preparation of Formal Written Report**
Graduates will develop the ability to produce a formal well-written report describing the creation of an analytical model used to solve a particular problem. The report will describe the modeling process to a reader not necessarily knowledgeable about particular modeling techniques. It will include appropriate sensitivity analysis and a clear recommendation based on the analytical results.

**Delivery of Oral Presentation**
Graduates will develop the ability to make a formal presentation describing the creation of an analytical model used to solve a particular problem. The presentation will describe the modeling process to an audience not necessarily knowledgeable about particular modeling techniques. It will include appropriate sensitivity analysis and a clear recommendation based on the analytical results. The presentation will include a demonstration of the ability to respond to a variety of client questions with answers supported by analytical results.

- Business Analytics Major (B.S.) (http://collegecatalog.lemoyne.edu/madden-business/business-analytics/business-analytics-major)  
- Business Analytics Dual Majors (B.S.) (http://collegecatalog.lemoyne.edu/madden-business/business-analytics/business-analytics-dual-majors)  

**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 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 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
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 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 440. 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, healthcare, social media, entertainment, and socio-economic data. The effective communication of the results and insights from the analysis, including via well-designed visualizations, will be emphasized throughout the course.
Prerequisites: ANL 301 and STA 202, or permission of instructor.

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 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.