

MANAGEMENT SCIENCE (MGSC)

MGSC 3010 Introduction to Business Analytics (3)

This course introduces students to using the computer as a business-modeling tool. The overarching goal is to teach students to use computers to analyze models and interpret data for integrated decision-making across multiple domains, including finance, marketing, accounting, strategy and operations. The course material consists of four modules. The first module concerns data modeling and builds on INFO 1010 by reviewing data modeling in Excel. The second module focuses on deterministic modeling, including decision-making under certainty, and the use of optimization models such as linear programming. This module also covers topics such as portfolio optimization, transportation and assignment, and introduces students to the concepts of problem formulation and sensitivity analysis. The third module focuses on spreadsheet automation, including concepts for programming in Excel. The fourth module covers probabilistic modeling. This module uses simulation and decision analysis principles in uncertain environments. In addition, students will learn to choose the appropriate probability distribution for a given problem. Prerequisite(s): INFO 1010 and (MATH 1140 or 1230).

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MGSC 4320 Business Analytics (3)

This course introduces the concepts, methods and software used in the emerging field of business analytics. Students use computer languages, software packages and statistical methods to collect and to analyze large data sets and to apply the results in business performance improvement and planning. The course employs examples, exercises and cases that demonstrate how business analytics has been transforming decision-making processes in many companies and industries. Students improve their knowledge of and skills in computing and data analysis and enhance their analytical capabilities and problem-solving abilities. Prerequisite: MGSC 3010

Prerequisite(s): MGSC 3010.

MGSC 5380 Business Study Abroad - MGSC (1-20)

Course may be repeated up to unlimited credit hours.

Maximum Hours: 99

MGSC 5390 Business Study Abroad - MGSC (1-20)

Course may be repeated up to unlimited credit hours.

Maximum Hours: 99

MGSC 6000 Intro to Business Analytics (3)**MGSC 6020 Business Stats and Models (3)**

Methods for summarizing, analyzing, and making inferences from statistical data germane to management are learned. Topics include descriptive statistics, probability concepts, discrete and continuous probability distributions, sampling distributions, confidence intervals, hypothesis testing, simple and multiple regressions, and chi-squared tests. The methods are applied to management problems drawn from finance, marketing, accounting, operations management, human resources management, economics, and strategic planning.

MGSC 6090 Ops and Supply Chain Mgmt (3)

The management of technology, people, and business processes presents one of the most critical challenges to business leaders. To achieve competitive advantage, managers must thoroughly understand the complex processes underlying the development, manufacture, and distribution of products as well as the creation and delivery of services. This course will expose students to topics and techniques related to operations, design, and management of supply chains by means of qualitative and quantitative techniques. The course material is applicable to a broad range of industries such as electronics, online services, insurance, healthcare, retail, fashion, automotive, manufacturing, and more. The topics covered include: process, capacity, inventory, revenue, supply chain, quality, and project management. Prerequisite: MGSC 6020.

Prerequisite(s): MGSC 6020 or 7330.

MGSC 7000 Bus Analytics Practicum (3)

This course introduces business analytics. It involves three components: (1) an overview of business analytics, (2) introduction to tools for business analytics and (3) field trips to companies and follow-up sessions on how business analytics creates value in the real-world.

MGSC 7100 SQL Data Fund and Bus Intel (3)

The effective use of data across firms to deliver fast and intelligent services presents one of the most critical challenges to today's business leaders. This course is designed to introduce students to basic concepts and techniques in the theory, design, implementation and administration of relational databases. Topics to be covered include, the database design process, the entity-relationship (ER) model, normalization, queries in Structured Query Language (SQL), distributed and client-server databases, database administration, and big data analysis. We will build a database application as a completion project. This course focuses on the skills and concepts needed to design and query databases and therefore contribute to companies' competitive positions.

MGSC 7310 Modeling and Analytics (3)

The widespread proliferation of IT-mediated economic activity generates a large amount of micro-level data about consumer, supplier, and competitor preferences. This has led to the emergence of a new form of competition based on the extensive use of analytics, experimentation, and fact-based decision-making. In nearly every industry, the competitive strategies that organizations are employing today rely extensively on data analysis to predict the consequences of alternative course of action, and to guide executive decision-making. This course provides a hands-on introduction to the concepts, methods, and processes of business analytics. Students will learn how to obtain and draw business inferences from data by asking the right questions and using the appropriate tools. Topics include data preparation, statistical tools, data mining, and the overall process of using analytics to solve business problems. Students will work with real-world business data and analytics software such as R. Students should also have a basic familiarity with elementary probability and be comfortable with basic data manipulation. Prerequisite(s): MGSC 6020 or ENRG 7110.

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MGSC 7320 Advanced Spreadsheet Modeling (3)

This course covers the use of Microsoft Excel and the programming language Visual Basic for Applications (VBA) within Excel for obtaining, managing, and processing information. Example areas covered include (1) automatically producing customized mass emails and summary reports, (2) updating Excel databases with 100 or more sheets, (3) copying from a user's workbook to a separate master workbook for analysis and returning solutions, and (4) solving a series of optimization models for various exchange rates. Most of the managerial problems used for illustration involve financial and operations applications. Illustrations from actual company projects demonstrate the power and versatility of course concepts. No prior exposure to VBA or any other programming language is required. Prerequisite(s): ENRG 7110, MGSC 7000 or 6020.

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MGSC 7330 Bus Stats and Modeling with R (3)

Prerequisite(s): MGSC 7000.

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MGSC 7340 Web Analytics (3)

This course will provide students an overview of web analytics so that they can measure business goals and find areas of improvement. Students will learn how to apply value measurements to the website, analyze user behavior and optimize the content for the best possible search engine ranking and conversion. In this course students will be given a comprehensive overview of key concepts, tools and techniques related to analysis of quantitative internet data to optimize websites and web marketing initiatives.

MGSC 7520 Adv Modeling and Analytics (3)

This course intends (1) to expose students to advanced theories and techniques in business analytics and (2) to familiarize students with advanced tools and packages. The advanced theories and techniques will cover the following broad areas: data analytics (e.g., feature selection, imputation), model analytics (e.g., advanced models, model enhancement), and customer analytics (e.g., consumer survival, consumer choice, counting & timing) and other special topics. R and Python including their various packages are the main tools we use. We may cover other advanced techniques and tools depending on interest and time availability. Prerequisite(s): MGSC 7310.

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MGSC 7530 Advanced Data Management (3)

This advanced data and database management course covers the following topics: database design with entity-relationship (ER) model and relational data model; advanced Structured Query Language (SQL) with a focus on answering complex business questions; data normalization; data warehouse and data lake; SQL interface with cloud and big data (such as Hadoop, Hive and Azure); and SQL interface with data analytics and machine learning. This course puts an emphasis on the advanced concepts and skills needed to manage data in cloud and big data environment and therefore contribute to companies' data analytics strategy. Prerequisite(s): MGSC 7100.

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MGSC 7650 Applied Machine Learning (3)

Machine learning is a fast-growing field - more businesses are employing machine learning techniques to solve big data analytics problems. This course focuses on teaching learners a blend of machine learning techniques and application development. Students will learn how to identify an appropriate machine learning technique and how to apply the technique to a real-world business dataset. The emphasis will be on application of machine learning technique rather than statistical theory behind the technique. By the end of the course, students will be able to develop an end-to-end interactive machine learning application using an enterprise technology platform. Prerequisite(s): MGSC 7310 and 7330.

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MGSC 7870 Business Analytics Projects (3)

In this semester-long experiential learning course, students work in teams on various analytics projects sponsored by faculty and industry partners. Each team needs to apply analytics techniques and tools on real-world problems. In addition to gaining real-world experience, students develop communication, presentation and leadership skills pertinent to business analytics. Prerequisite(s): MGSC 7310, 7330, 7520* (* May be taken concurrently.)

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MGSC 7960 Independent Study (1-3)

Independent study: Management Science.