MGSC 3010 Intro to Business Analytics (3 Credit Hours)
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 MATH 1140 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: MATH 1140 or MATH 1230

Prerequisite(s): MATH 1140, 1140, 1140, 1140, 1140, 1230, 1230, 1230, 1230 or 1230.

MGSC 4320 Business Analytics (3 Credit Hours)
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): INFO 3010 or MGSC 3010.

MGSC 6020 Business Stats and Models (3 Credit Hours)
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 Credit Hours)
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.

MGSC 7000 Bus Analytics Practicum (3 Credit Hours)
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 Credit Hours)
This course is designed for the Master of Business Analytics program of the Freeman School. 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 Credit Hours)
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): STAT 6020 or ENRG 7110.
MGSC 7320  **Advanced Spreadsheet Modeling**  *(3 Credit Hours)*
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):** STAT 6020, ENRG 7110 or MGSC 7000.

MGSC 7330  **Bus Stats and Modeling with R**  *(3 Credit Hours)*
**Prerequisite(s):** MGSC 7000.

MGSC 7510  **Bus Analytics Projects I**  *(3 Credit Hours)*
Students work in teams on various analytics projects sponsored by faculty and industry partners. Each team needs to apply techniques and tools from Modeling and Analytics course 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*.
* May be taken concurrently.

MGSC 7520  **Adv Modeling and Analytics**  *(3 Credit Hours)*
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.

MGSC 7600  **Business Analytics Proj II**  *(3 Credit Hours)*
Students work in teams on various analytics project sponsored by faculty and industry partners. Each team needs to apply techniques and tools from Modeling and Analytics on real-world problems. In addition to gaining real-world experience, students develop communication, presentation and leadership skills pertinent to business analytics.

MGSC 7960  **Independent Study**  *(1-3 Credit Hours)*
Independent study: Management Science.