BUSINESS INFORMATION AND ANALYTICS

Master of Science in Business Analytics

The University of Denver’s Daniels College of Business Masters of Science in Business Analytics program balances the three pillars of business intelligence: data management, analytics, and business decisions. Graduates will be able to inform through evidence-driven decision making. During the program, students work with companies on actual problems by leveraging data to produce real outcomes for real implementation. Through partnerships with IBM/SPSS, Tableau, Microsoft and other leading technology vendors, Daniels is able to provide the most relevant tools in analytics in our classrooms. This gives students an edge in solving complex statistical problems and keeps them ahead of the curve. This is a STEM designated degree and is a 12–36-month, full or part-time, 58-credit program with two components: Business Analytics Core (50 credits) and Electives (8 credits).

Daniels has been continuously accredited by the Association to Advance Collegiate Schools of Business International (AACSB) since 1923.

Master of Science in Business Analytics

Admission Requirements

• Application fee $100 non-refundable.
• GMAT or GRE Scores required. Applicants who wish to be considered for merit-based scholarships or graduate assistantships are encouraged to take the GMAT. To have your GMAT or GRE scores reported to Daniels, please use the following codes: GMAT code MZR-GT-43 and the GRE code is 4842.
• Official Transcripts. Submit one official transcript from each higher educational institution you attended in officially sealed envelopes. Transcripts that arrive in opened envelopes are not considered official.
• Submit a resume that focuses on your unique strengths and accomplishments.
• Two letters of recommendation are required from individuals (nonrelatives) who can evaluate your academic and/or work performance as well as your potential for success in graduate school.
• Two required and one optional essay. Essays are assessed for clarity, organization, conciseness and grammar. Through the essays, you can communicate what you hope to achieve at Daniels and how you will contribute to the Daniels community.
• Admissions Interview: Applicants are contacted by a Daniels representative to schedule the admissions interview, which will be conducted in person, by phone, or via web cam.
• Tuition Deposit: If accepted into the program, a $500 deposit is due to reserve your seat. This deposit is non-refundable and is credited toward your first tuition payment.

Language Proficiency

• Official scores from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) are required of all graduate applicants, regardless of citizenship status, whose native language is not English or who have been educated in countries where English is not the native language. Applications will not be processed until the required TOEFL or IELTS score is received. The TOEFL and IELTS scores are valid for two years from the test date and are considered official only when received directly from the testing agency.
• A minimum of an 88 TOEFL (no less than a 20 on any section) or a minimum of a 6.5 IELTS (no less than 6.0 on any section) is required to apply.
• Applicants may be exempted from English proficiency test requirements if by the time of matriculation they have earned a baccalaureate degree or higher from a formally-recognized/accredited university where the institution’s language of instruction and examination is English. Such applicants may be exempt from the TOEFL/IELTS and the English Language Proficiency Assessment requirement but not from other standardized graduate entrance examinations.
• Students whose native language is not English and who are required to submit TOEFL/IELTS (http://bulletin.du.edu/graduate/admissions/additionalstandardsforonnativeenglishspeakers) scores will be assessed by the University of Denver English Language Center (ELC).

Master of Science in Business Analytics

Degree Requirements

Core coursework requirements

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>Survey of Business Analytics</td>
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<td>INFO 4340</td>
<td>Data Mining and Visualization</td>
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<td>Complex Data Analytics</td>
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<td>INFO 4380</td>
<td>Decision Processes</td>
<td>4</td>
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<td>INFO 4400</td>
<td>Business Analytics Capstone</td>
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<tr>
<td>INFO 4590</td>
<td>Optimization</td>
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Elective requirements

8 credits in electives required in 4000 level Daniels courses.

Total Credits: 58

Minimum Number of Credits Required: 58

Courses

INFO 4100 Survey of Business Analytics (4 Credits)
This course provides an overview of business analytics: how data are generated, collected, actively warehoused and analyzed to support decision making. It addresses how to combine data with corporate processes and culture to gain new insights to empower corporate strategy and improve daily operations.

INFO 4120 Python for Business Analytics (4 Credits)
Python is a popular general purpose programming language which is well suited to a wide range of problems. With the right set of add-ons, it is comparable to domain-specific languages such as R and MATLAB. Python is a scripting language. The following topics will be covered: Importing data, Reading and writing files, Cleaning and Managing Data, Merging and joining DataFrame objects, Plotting and Visualization, Statistical Analysis, Fitting data to probability distributions and Linear models. Packages: Pandas, NumPy, matplotlib, statsmodels, Scikit-learn, and IPython. Principal Content Elements: 1. Introduction to Programming Logic and Design Using Python 2. Data Management 3. Statistical Analysis 4. Advanced Data Management and Statistical Analysis Prerequisites: STAT 4610.

INFO 4140 Business Databases (4 Credits)
This is an introductory database course which covers enterprise database design, modeling and implementation.

INFO 4200 Business Analytics Capstone Planning (2 Credits)
This course provides the foundation for the capstone course. Students begin the planning phase for their culminating project, identifying a business need and company with which to partner. Students then outline the problem, determine objectives and project deliverables, create a document of understanding, and produce a work plan. Prerequisite: STAT 4610.

INFO 4240 Data Warehousing (4 Credits)
This course addresses how to extract and time stamp data from many different business databases, transform it into a common compatible format, and load it into the data warehouse. The course includes using the data warehouse for real time queries as well as generating longer period reports for strategy considerations. Data marts and data mining are also included as part of this course. Prerequisites: INFO 4100 and INFO 4140.

INFO 4250 Data Driven Decision Making (4 Credits)
Businesses make decisions and improve processes using their own and external data and a variety of modeling and analytic techniques. This course introduces students to the business data landscape, data management in organizations, the data-driven decision-making process, and the fundamental concepts behind statistical inference and analytic modeling to support decision-making.

INFO 4280 Project Management (4 Credits)
In this course students examine the science, practice the art, and discuss the folklore or project management to enable them to contribute to and manage projects as well as to judge when to apply this discipline. The course also covers the use of MS Project Professional as a management tool and Crystal Ball as a Monte Carlo simulator for project exercises. Students also learn the fundamentals of process and project simulation for business decision-making. Prerequisite: INFO 4100.

INFO 4300 Predictive Analytics (4 Credits)
This course is designed to prepare students for managerial data analysis and data mining, predictive modeling, model assessment and implementation using large data sets. The course addresses the how, when, why and where of data mining. The emphasis is on understanding the application of a wide range of modern techniques to specific decision-making situations, rather than on mastering the theoretical underpinnings of the techniques. The course covers methods that are aimed at prediction, forecasting, classification, clustering and association. Students gain hands-on experience in using computer software to mine business data sets. Prerequisite: STAT 4610.

INFO 4340 Data Mining and Visualization (4 Credits)
In this course, students create business intelligence tools such as balanced scorecards, data visualization and dashboards to inform business decisions. The course focuses on the identification of metrics, measures, indicators and key performance indicators for a variety of business operations. The focus is on the advantages and disadvantages of various modeling methodologies and implementations moving towards performance improvement. Prerequisite: STAT 4610.
INFO 4360 Complex Data Analytics (4 Credits)
This course explores the concepts of the considerations and management of big data projects. It also explores technical aspects of performing text analytics and natural language processing, network analysis, as well as geographic data analysis. We will focus on social data for some of the examples and also explore how disparate data sources can be combined to provide insight for business decisions. Prerequisite: STAT 4610 preferred but not required.

INFO 4380 Decision Processes (4 Credits)
This course addresses the process of decision making in the enterprise: who makes what decisions based on what information and for what purpose. Business Intelligence is premised on the HP motto: "in God we trust. All others bring data." But what is the cost of collecting and analyzing the data and presenting the results, and what decisions justify that cost? Is the transformation from data to decision always rational, and what are the common pitfalls for human decision makers? We examine the results of recent experiments from behavior economics and their relevance to making business decisions. Prerequisite: INFO 4100.

INFO 4400 Business Analytics Capstone (4 Credits)
This course gives students an opportunity to apply the knowledge and skills learned in this program to a real-world problem submitted by a partner business. Students take a business problem from model construction and data collection through an analysis and presentation of results to recommendations for specific business decisions. Prerequisite: INFO 4200.

INFO 4401 Business Analytics (2 Credits)
Businesses can never have perfect information; therefore, they must employ statistical techniques to improve the decision-making process. This course introduces students to managerial decision-making using probability and other statistical techniques to support and validate the chosen decision. A student project will focus on data collection (primary research), data analysis, decision analysis, written/oral presentation skills, and the development of an infographic.

INFO 4520 Health Informatics (4 Credits)
Annual health care spending in the United States exceeds 16% of GDP ($2 Trillion) and is expected to continue to increase. The effective use of information technology is perceived as an important tool in increasing the access to and quality of health care delivery in a cost effective manner. This course examines the role of health informatics in the health care delivery and management process. The objectives of this course are to familiarize students with the critical issues and challenges faced by those in the health care environment, what technologies are or will soon be available to potentially address these issues and challenges, potential barriers professionals employed in the health care field may face deploying and managing these technologies, and possible strategies to assist these professionals in addressing and overcoming these barriers. This course focuses on four major areas related to health informatics: the role of electronic health records, clinical decision support systems, analytics, and other e-health initiatives such as mobile technologies and telehealth.

INFO 4590 Optimization (4 Credits)
This course introduces students to the basic optimization modeling techniques and tools as practiced by business analysts, operations research analysts, data analysts, data scientists, decision scientists, decision support scientists, business intelligence analysts, quants, actuaries, financial analysts, marketing analysts, and anyone else interested in using analytics to improve the bottom line. The course will focus on problem definitions, problem configuration, spreadsheet solution, LP Software (LINGO) solutions, and interpreting and implementing results.

INFO 4700 Topics in Business Analytics (0-10 Credits)
Exploration of current trends and topics in business analytics. Prerequisite: INFO 4100.

INFO 4991 Independent Study (1-10 Credits)
INFO 4992 Directed Study (1-4 Credits)