MASTER OF SCIENCE (M.S.) MAJOR IN DATA ANALYTICS AND INFORMATION SYSTEMS (NON-THESIS OPTION)

Program Overview

The science of analyzing data to make actionable data-driven business decisions and gain competitive advantage has received widespread attention among business and government enterprises in the last few years. Variously referred to as Business Intelligence, Data Analytics, or Data Science, this is an emerging field that uniquely combines mathematical and statistical modeling, data visualization and information systems. The primary driving force behind the significant increase in the use of data analytics has been the extensive digitization of intra- and inter-organizational processes that generate massive amounts of data. This discipline has experienced an explosive growth during the past few years.

The main objective of the M.S. major in Data Analytics and Information Systems is to ensure that graduates can use appropriate data analysis methods and cutting-edge information technologies to derive actionable business intelligence. In a survey by KPMG, 99% of surveyed executives indicated that the skills for managing and analyzing big data sets to derive actionable insights is important for developing sound business strategy. This requires employees with advanced knowledge of data management technologies to manage big data sets and apply appropriate analytical techniques to analyze these data sets. The proposed program will provide students with integrated knowledge of information technology and data analysis methods to effectively manage and analyze data to support data-driven decision-making.

The curriculum of the degree program will provide students with the technical skills required for the DSA jobs. This includes both information systems and data analytics skills such as data management, structured query language, R and Python programming, descriptive, predictive and prescriptive analytics, machine learning, statistical computing, big data analysis, and data visualization.

Application Requirements

The items listed below are required for admission consideration for applicable semesters of entry during the current academic year. Submission instructions, additional details, and changes to admission requirements for semesters other than the current academic year can be found on The Graduate College's website (http://www.gradcollege.txstate.edu). International students should review the International Admission Documents webpage (http://mycatalog.txstate.edu/graduate/admission-documents/international/) for additional requirements.

- completed online application
- $55 nonrefundable application fee
- or
- $90 nonrefundable application fee for applications with international credentials
- baccalaureate degree from a regionally accredited university

- official transcripts from each institution where course credit was granted
- a competitive GPA in the last 60 hours of undergraduate course work (plus any completed graduate courses)
- official GMAT or GRE (general test only) with a competitive score
- responses to specific essay questions and a personal statement
- resume/CV detailing work experience, extracurricular and community activities, and honors and achievements
- three letters of recommendation from individuals best able to assess the student’s ability to succeed in graduate school

TOEFL or IELTS Scores

- Non-native English speakers who do not qualify for an English proficiency waiver:
  - official TOEFL iBT scores required with a 78 overall and minimum individual module scores of
    - 19 listening
    - 19 reading
    - 19 speaking
    - 18 writing
  - official IELTS (academic) scores required with a 6.5 overall and
    - minimum individual module scores of 6.0

This program does not offer admission if the scores above are not met.

Degree Requirements

The Master of Science (M.S.) degree with a major in Data Analytics and Information Systems non-thesis option requires 30 semester credit hours.

Any student enrolled in a graduate degree program in the McCoy College of Business Administration can earn no more than two grades of C or lower. Even if the grade of C or lower was replaced with a higher grade as a result of repeating the course, the original grade counts as a “strike” under this policy. Upon earning the third C (or lower), the student is automatically placed on academic suspension and permanently dismissed from their degree program without any possibility of readmission to their program or another degree program in McCoy College. The 3 C Policy takes precedent over probationary status. So, if a student earns a third C they are automatically dismissed from their program permanently; even if probation does not occur.

Course Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CIS 5355</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5357</td>
<td>Computing for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5364</td>
<td>Data Warehousing</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5367</td>
<td>Machine Learning</td>
<td>3</td>
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<tr>
<td>QMST 5332</td>
<td>Optimization</td>
<td>3</td>
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<tr>
<td>QMST 5334</td>
<td>Statistical Methods for Business</td>
<td>3</td>
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<tr>
<td>QMST 5335</td>
<td>Forecasting and Simulation</td>
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<tr>
<td>QMST 5336</td>
<td>Analytics</td>
<td>3</td>
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Prescribed Electives

Choose 6 hours from the following: 6
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CIS 5358</td>
<td>Agile Project Management For Business Professionals</td>
</tr>
<tr>
<td>CIS 5369</td>
<td>Independent Study in Computer Information Systems</td>
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<tr>
<td>CIS 5370</td>
<td>Enterprise Resource Planning and Business Intelligence</td>
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<tr>
<td>CIS 5390C</td>
<td>Statistical Computing</td>
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<tr>
<td>or QMST 5390A</td>
<td>Statistical Computing</td>
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<tr>
<td>CIS 5395</td>
<td>Internship in Computer Information Systems</td>
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<tr>
<td>GEO 5301</td>
<td>Multivariate Quantitative Methods</td>
</tr>
<tr>
<td>GEO 5418</td>
<td>Geographic Information Systems I</td>
</tr>
<tr>
<td>GEO 5419</td>
<td>Geographic Information Systems II</td>
</tr>
<tr>
<td>HIM 5311</td>
<td>Informatics, Analytics and Data Use</td>
</tr>
<tr>
<td>HIM 5340</td>
<td>Healthcare Informatics</td>
</tr>
<tr>
<td>IE 5310</td>
<td>Advanced Statistical Design of Experiments for Engineers</td>
</tr>
<tr>
<td>IE 5340</td>
<td>Applied Deterministic Operations Research for Engineers</td>
</tr>
<tr>
<td>IE 5343</td>
<td>Non-Linear Optimization Techniques for Engineers</td>
</tr>
<tr>
<td>IE 5398C</td>
<td>Data-Intensive Analysis and Simulation for Engineers</td>
</tr>
<tr>
<td>MGT 5311</td>
<td>Process Improvement Management in Organizations</td>
</tr>
<tr>
<td>MGT 5321</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>MKT 5322</td>
<td>Marketing Research Methods</td>
</tr>
<tr>
<td>MKT 5323</td>
<td>Qualitative Research in Marketing</td>
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<tr>
<td>MKT 5340</td>
<td>Digital Marketing</td>
</tr>
<tr>
<td>MKT 5345</td>
<td>Digital Analytics</td>
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<tr>
<td>QMST 5342</td>
<td>Probability and Statistical Models</td>
</tr>
<tr>
<td>QMST 5343</td>
<td>Data Mining</td>
</tr>
<tr>
<td>QMST 5395</td>
<td>Internship in Analytics</td>
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**Total Hours** 30

### Comprehensive Examination Requirement

All MSDAIS students are required to take a written comprehensive examination in their last semester of the program. Students must pass the comprehensive exam during the last semester in at most two attempts. If a student fails to pass the comprehensive exam in two attempts during the final semester, the student will retake the comprehensive exam during the next regular semester.

Students who do not successfully complete the requirements for the degree within the timelines specified will be dismissed from the program.

Master’s level courses in Data Analytics and Information Systems: CIS, QMST

### Courses Offered

**Computer Information Systems (CIS) (p. 199):**

**CIS 5199B. Thesis.**
This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis. 1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit

**CIS 5299B. Thesis.**
This course represents a student's continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis. 2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.

Course Attribute(s): Exclude from 3-peat Processing

Grade Mode: Credit/No Credit

**CIS 5318. Information Technology in the Digital Economy.**
Provides an understanding of the issues involved in the strategic management of the information assets of organizations. Examines the issues and challenges that users face within the Information Technology (IT) management arena as part of a firm's business and IT strategy. Focus is on managerial rather than technical issues. Prerequisite: BA 5351 with a grade of 'C' or better.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

**CIS 5355. Database Management Systems.**
Explores the concepts, principles, issues and techniques for managing corporate data resources using database management systems. The course includes techniques for analysis, design and development of database systems, creating and using logical data models, database query languages, and procedures for evaluating database management software. Students will use a relational database management system to develop a management information system.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

**CIS 5356. Business Telecommunications.**
Explores the technology that is revolutionizing the manner in which business and government conduct their operations and the effects new developments in communication media have on computing systems. This course reflects the current state-of-the-art in data communication networking.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter

**CIS 5357. Computing for Data Analytics.**
This course focuses on fundamentals of programming. Students will learn to design and implement applications, and programmatically handle a variety of data management functionalities.

3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.

Grade Mode: Standard Letter
CIS 5358. Agile Project Management For Business Professionals.
An in-depth study of the project management body of knowledge as applied to Information Technology with emphasis on Agile methodologies and the management of scope, costs, schedules, quality and risks. Includes program management, system methodologies, material procurement, and human, cultural, and international issues and their impact on the organization.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

This course is designed to familiarize students with current and emerging e-commerce technologies. Topics include Internet technology for business advantage, reinventing the future of business through e-commerce, business opportunities in e-commerce, and social, political, global, and ethical issues associated with ecommerce.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CIS 5364. Data Warehousing.
Familiarizes students with current and emerging data warehousing technologies that play a strategic role in business organizations. Topics include data warehouse development life cycle, data warehouse navigation, data quality, and performance issues. Prerequisites: CIS 5355 with a grade of ‘C’ or better.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

This course focuses on deriving actionable knowledge from data using algorithms and industry standard tools. It covers the complete process, key technologies, core machine learning algorithms, and programming used for business intelligence. Prerequisite: CIS 5357 and QMST 5336 both with grades of ‘C’ or better.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

This course covers the analysis, design, development, implementation, and maintenance of information security systems. Topics include legal, ethical, professional, personnel issues; risk management; technology; cryptography; and physical security.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CIS 5369. Independent Study in Computer Information Systems.
This course focuses on individual in-depth research. Students, in consultation with a faculty member, choose a selected area of study in CIS and work independently on a specialized project. Course may be repeated with approval of department chair. Prerequisite: Instructor approval.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

CIS 5370. Enterprise Resource Planning and Business Intelligence.
The use of information technology in integrating enterprises for operational control and business intelligence is examined via Enterprise Resource Planning (ERP) applications in customer relationships management, accounting, finance, purchasing, production control, sales, marketing, and human resource management. Emphasizes managerial issues surrounding the need, selection, and implementation of ERP systems.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CIS 5371. Accounting Information Systems and Controls.
A study of accounting information systems and controls as well as their role in the current technology-intensive business environment. Emphasis is placed on contemporary technology and applications, IT and business systems assessments, IT internal controls, control concepts and procedures, information systems auditing, and transaction cycles. Prerequisite: ACC 3313 or ACC 5361 either with a grade of ‘C’ or better.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

This course focuses on the technology and managerial issues related to information policies, regulations, and compliance that assure confidentiality, integrity, and availability of data and computer systems. Topics include information security policy, regulations, laws, standards, framework, compliance, and governance. Prerequisite: CIS 5368 with a grade of ‘C’ or better.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

This course covers programming and statistical computing concepts. Programming concepts include data manipulation, data structures, control structures, functions, basic algorithms, and matrix manipulations. Statistical computing topics include numerical linear algebra, Monte Carlo methods, and numerical optimization.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

CIS 5395. Internship in Computer Information Systems.
This course provides students with opportunities for experiential learning by working on a computer information systems project. It enables integration of professional and academic experience through internship with an external employer. Prerequisite: Instructor approval.
3 Credit Hours. 1 Lecture Contact Hour. 20 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

CIS 5399A. Thesis.
This course represents a student’s initial thesis enrollment. No thesis credit is awarded until the student has completed the thesis in Data Analytics and Information Systems. Graded on a credit (CR), progress (PR), no-credit (F) basis.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit
QMST 5390A. Statistical Computing.
This course covers programming and statistical computing concepts. Programming concepts include data manipulation, data structures, control structures, functions, basic algorithms, and matrix manipulations. Statistical computing topics include numerical linear algebra, Monte Carlo methods, and numerical optimization.

QMST 5399B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

QMST 5334. Statistical Methods for Business.
The course provides the quantitative foundation for business analysis and decision making. Topics include: inferential statistics, regression analysis, and other analytical/modeling techniques with wide applicability in decision-making and problem solving in all functional areas of business.

QMST 5342. Probability and Statistical Models.
This course introduces the concept of probability and probability distributions. It includes general and generalized linear models, inflated and mixture models, and hierarchical models. Model validation and choice will also be discussed. Prerequisite: QMST 5336 with a grade of 'C' or better.

QMST 5343. Data Mining.
This course covers data mining concepts and applications of data mining techniques to solve business problems. It emphasizes algorithms such as classification, clustering, association, and text mining. Model selection and assessment are also emphasized. Prerequisite: QMST 5336 with a grade of 'C' or better.

QMST 5369. Independent Study in Quantitative Methods.
This course focuses on individual in-depth research. Students, in consultation with a faculty member, choose a selected area of study in quantitative methods and work independently on a specialized project. Course may be repeated with approval of department chair. Prerequisite: Instructor approval.

QMST 5360. Forecasting and Simulation.
This course introduces the concepts and principles of forecasting and simulation techniques as applies to planning and decision making in organizations. Topical coverage includes time series forecasting, casual forecasting, discrete event simulation, and continues-event simulation techniques.

QMST 5399B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

QMST 5336. Analytics.
This course introduces analytics which refers to the process of transforming data into information for making decisions. The topics include the introduction to analytics, visualization, analytics applications, and challenges related to business data. Students will learn how to use software, conduct data analysis and communicate their results.

QMST 5332. Optimization.
A study of management science/operations research emphasizing theory and applications of evaluative, predictive, and optimizing models as applied to the management of product and service-oriented operations.

This course covers the quantitative foundation for business analysis and decision making. Topics include: inferential statistics, regression analysis, and other analytical/modeling techniques with wide applicability in decision-making and problem solving in all functional areas of business.

QMST 5335. Forecasting and Simulation.
This course introduces the concepts and principles of forecasting and simulation techniques as applies to planning and decision making in organizations. Topical coverage includes time series forecasting, casual forecasting, discrete event simulation, and continues-event simulation techniques.

QMST 5332. Optimization.
This course introduces the concept of probability and probability distributions. It includes general and generalized linear models, inflated and mixture models, and hierarchical models. Model validation and choice will also be discussed. Prerequisite: QMST 5336 with a grade of 'C' or better.

QMST 5399B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.

QMST 5369. Independent Study in Quantitative Methods.
This course focuses on individual in-depth research. Students, in consultation with a faculty member, choose a selected area of study in quantitative methods and work independently on a specialized project. Course may be repeated with approval of department chair. Prerequisite: Instructor approval.

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This course covers the quantitative foundation for business analysis and decision making. Topics include: inferential statistics, regression analysis, and other analytical/modeling techniques with wide applicability in decision-making and problem solving in all functional areas of business.

QMST 5335. Forecasting and Simulation.
This course introduces the concepts and principles of forecasting and simulation techniques as applies to planning and decision making in organizations. Topical coverage includes time series forecasting, casual forecasting, discrete event simulation, and continues-event simulation techniques.
QMST 5395. Internship in Analytics.
This course is based on experiential learning while the student works in quantitative methods and statistics. Students will integrate both professional and academic experiences through the internship with an external employer. Prerequisite: Instructor approval.
3 Credit Hours. 1 Lecture Contact Hour. 20 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

QMST 5399A. Thesis.
This course represents a student’s initial thesis enrollment. No thesis credit is awarded until the student has completed the thesis in Data Analytics and Information Systems. Graded on a credit (CR), progress (PR), no-credit (F) basis.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

QMST 5399B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

QMST 5599B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.
5 Credit Hours. 5 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

QMST 5999B. Thesis.
This course represents a student’s continuing thesis enrollment. The student continues to enroll in this course until the thesis is submitted for binding. Graded on a credit (CR), progress (PR), no-credit (F) basis.
9 Credit Hours. 9 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit