Data Analytics

Contact Information
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• Masters Degree
• Graduate's Certificate

The M.S. in Data Analytics aims at providing an interdisciplinary approach to data analytics that covers both the foundational mathematical knowledge of data science and the computational methods and tools for preprocessing, interpreting, analyzing, representing, and visualizing data sets. The degree is offered in both on-campus and online* formats. Applications are accepted each spring and fall semester. The Data Analytics program may, at its own discretion, accept new students in the summer semester, and consider accepting students under conditional admission, thereby allowing students to take classes at UIS to complete the program's entrance requirements. Upon the completion of all entrance requirements, the student will be fully admitted.

Students must have completed a course in data structures and algorithms to be considered for admission to the master's degree program.

We also offer the Data Analytics Graduate Certificate designed for students who would like to acquire the basic knowledge and skills required for data science professionals to boost their marketability. The certificate provides fundamental knowledge in pre-processing, cleaning, exploring and visualizing data and machine learning and predictive analysis as well as storage, management and analysis of big data.

The Master's Degree

Advising
On acceptance, students are assigned their academic advisor. Before registering for the first time, the student should discuss an appropriate course of study with the academic advisor.

Grading Policy
Students must earn a grade of B- or better in all courses that apply toward the degree, and a cumulative 3.0 grade point average is required to graduate. In addition, graduate students who do not maintain a 3.0 grade point average will be placed on academic probation according to campus policy. Graduate students enrolled in 400-level courses should expect more stringent grading standards and/or additional assignments. Courses taken on a CR/NC basis will not count toward the degree.

Transfer Courses
Students are allowed to transfer a maximum of eight graduate semester hours with a grade of B or better. They will be evaluated on a case-by-case basis and approved by a Student Petition. Transfer students will be required to take a minimum of 28 credit hours of Data Analytics core and elective course work at UIS.

Requirements

Prerequisites
CSC 225 Computer Programming Concepts I 3
CSC 275 Computer Programming Concepts II 3
CSC 302 Discrete Structures 4
CSC 385 Data Structures and Algorithms 4
DAT 332 Matrix Analysis and Numerical Optimization 4
or MAT 332 Linear Algebra
MAT 113 Business Calculus 4
or MAT 115 Calculus I
MAT 121 Applied Statistics 3

Total Hours 25

Required Courses
CSC 472 Introduction to Database Systems 4
DAT 502 Introduction to Statistical Computation 4
DAT 530 Advanced Statistical Methods 4
CSC 532 Introduction to Machine Learning 4
CSC 534 Big Data Analytics 4
CSC 535 Deep Learning 4
DAT 554 Data Analytics Capstone 1 4

Electives (Choose two) 8
DAT 444 Operations Research Methods
or MAT 444 Operations Research Methods
CSC 533 Data Mining
CSC 561 NoSQL Databases
CSC 562 Data Visualization
CSC 570 Advanced Topics in Computer Systems
CSC 572 Advanced Database Concepts

Total Hours 36

1 The capstone project will draw upon the knowledge and skills learned throughout the entire curriculum and will ask students to apply the appropriate methods and tools for data analysis in a real-world organizational setting. The capstone course provides the opportunity to exercise different techniques for data storage, preprocessing, integration and analysis covered throughout the M.S. in Data Analytics curriculum in order to address business challenges. The students must provide a well-written report and an oral presentation to effectively communicate their findings.

Graduate Certificate
• Graduate Certificate in Data Analytics

Online Degree
• Data Analytics
• Graduate Certificate in Data Analytics
Courses

DAT 332. Matrix Analysis and Numerical Optimization. 4 Hours.
This course is an introduction to matrices and numerical optimization
with applications in engineering and science. Topics include Algebra
of matrices and systems of linear algebraic equations, rank, inverse,
eigenvalues, eigenvectors, vector spaces, subspaces, basis,
independence, orthogonal projection, determinant, linear programming
and other numerical methods. Course Information: Prerequisites: MAT
115 or MAT 113 or equivalent.

DAT 444. Operations Research Methods. 4 Hours.
Quantitative methods necessary for analysis, modeling, and decision
making. Topics include linear programming, transportation model,
network models, decision theory, game theory, PERT-CPM, inventory
models, and queuing theory. Additional topics may be chosen
from integer linear programming, system simulation, and nonlinear
programming. Course Information: Same as MAT 444 and PAD 431.
Prerequisite: MAT 332 with grade of C or better.

DAT 502. Introduction to Statistical Computation. 4 Hours.
Explore the use of various statistical software packages, such
as SAS, SPSS, and R. Topics will be selected from construction
of data set, descriptive analysis, regression analysis, analysis of
design experiment, multivariate analysis, categorical data analysis,
discriminant analysis, cluster analysis, and presentation of data
in graphic forms. Course Information: Prerequisites: CSC 225 or
equivalent and MAT 121 or equivalent.

DAT 530. Advanced Statistical Methods. 4 Hours.
Topics include multiple linear regression, statistical inferences for
regression model, diagnostics and remedies for multicollinearity, outlier
and influential cases, model selection, logistic regression, multivariate
analysis, categorical data analysis, discriminant analysis, cluster
analysis. Course Information: Prerequisites: MAT 121 or equivalent.

DAT 532. Introduction to Machine Learning. 4 Hours.
Machine learning explores the design and the study of algorithms that
can learn from data or experience, improve their performance, and
make predictions. The course provides an overview of many concepts,
techniques, and algorithms in machine learning, including supervised
learning, unsupervised learning, reinforcement learning, and neural
networks. Course Information: Prerequisites: CSC 385.

DAT 533. Data Mining. 4 Hours.
This course teaches advanced techniques for discovering hidden
patterns in the rapidly growing data generated by businesses, science,
web, and other sources. Focus is on the key tasks of data mining,
including data preparation, classification, clustering, association rule
mining, and evaluation. Course Information: Course is restricted to MS
CSC majors and MS DAT majors only. Prerequisites: CSC 385.

DAT 534. Big Data Analytics. 4 Hours.
This course teaches concepts and techniques in managing and
analyzing large data sets. Focus is on big data management, storage
solutions, query processing, analytics, and big data applications.
Topics include: introduction to Hadoop and YARN, MapReduce,
Apache Spark, Big Data Warehousing with Hive and Spark SQL,
large scale recommender systems and Large Scale Clustering and
Classification. Course Information: Prerequisites: CSC 385, CSC 472,
CSC 532 (co-requisite).

DAT 554. Data Analytics Capstone. 4 Hours.
This is a practicum course that allows students to apply the appropriate
methods and tools for data analysis in a real-world organizational
setting. The capstone course provides the opportunity to exercise
different techniques for data storage, preprocessing, integration and
analysis covered throughout the Master of Data Analytics curriculum in
order to address challenges from different areas. Course Information:
Co-requisites: CSC 534 and CSC 535.

DAT 555. Data Analytics Capstone Continuing Enrollment. 0
Hours.
This course is required for DAT students who took but have not
completed Capstone course DAT 554. Students must register for DAT
555 for zero credit hour (one billable hour) in all subsequent semesters
until DAT 554 is completed. Course Information: Restricted to DAT
majors.

DAT 570. Advanced Topics in Data Analytics. 4 Hours.
Topics and prerequisites vary. Students may refer to the course
schedule for topics and prerequisites. Restricted to Graduate Students,
Data Analytics majors or Computer Science majors.