

# DATA SCIENCE, MS

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## Mission

The **Master of Science in Data Science (MSDS)** enables students to pursue advanced careers in Data Science addressing state and national workforce shortages and supporting the growth of the local knowledge-based economy.

## Goals

The **Master of Science in Data Science (MSDS)** program equips students with the knowledge and skills to advance their current careers in or perform a mid-career transition into data science fields, to work independently and collaboratively, and to pursue academic or professional careers in education and research, industry, business, or government.

The program offers three curricular tracks: a **Research (Thesis) Track**, an **Applied (Project) Track**, and a **Course-only Track**. The research track facilitates students to advance careers in data science research, possibly continuing toward a doctoral degree. The applied project track maximizes the acquisition of advanced practical skills for professional placements in industry, business, or government. The Course Only track enhances the students' knowledge and skills in data science to advance or pursue cybersecurity careers.

Within each track, there are three concentrations from which students may choose: **Data Management and Intelligence, Knowledge and Information Systems**, and **Health Informatics**. To earn the Master of Science in Data Science degree, a student must complete 30 credit hours including Data Science core courses, courses within the chosen concentration, a project or thesis or an additional graduate course, and a research techniques course. Upon completion of the program, graduates will be awarded the MSDS degree.

## Program Outcomes

**Graduates of this program will be able to:**

- Demonstrate a comprehensive understanding of data science.
- Utilize advanced data science knowledge and skills to solve complex computing problems related to data science specialization.
- Identify and analyze user needs, and integrate data science-based solutions into user environment.
- Possess skills in data science leadership and information management.

## General Requirements for Program Admission

To be considered for MSDS admission, applicants must submit an application for admission to Graduate Studies at Clayton State University. Admission to the MSDS program requires an earned baccalaureate degree from an accredited college or university.

In addition to the general requirements as outlined in this catalog, applicants must have:

- Completed online application to the School of Graduate Studies
- Bachelor's degree with a minimum 2.5 GPA of undergraduate study from an accredited college or university
- Resume
- International students whose native language is not English are required to submit English Language Proficiency through one of the following options: TOEFL (minimum score of 78 total on the internet-based TOEFL), IELTS (minimum score of 6 total), Duolingo English Test (Minimum score of 100), or successful completion of an approved University System of Georgia (USG) intensive ESL program.
- If an applicant has completed any coursework, degree, or degrees from institutions outside of the United States, he or she must utilize a credential evaluation service. The School of Graduate Studies accepts an official course-by-course evaluation with a GPA that is prepared by either Josef Silney and Associates or World Education Services.

## Deadlines

Admit Term	Final Recommended Deadline
Fall	July 15
Spring	November 15
Summer	April 25

The final deadlines for Applications and supporting documents for **international graduate** students are:

Admit Term	Final Recommended Deadline
Fall	May 1
Spring	September 1
Summer	February 1

## Interested Applicants

Visit the Department of Computer Science and Information Technology webpage (<https://www.clayton.edu/cstem/csit/programs/>). You may also contact the department by email (CSIT@clayton.edu) or by phone at: (678) 466-4401.

**To apply**, visit the Clayton State University School of Graduate Studies webpage (<https://www.clayton.edu/graduate/>). (<https://www.clayton.edu/graduate/>)

## Program Requirements

The program offers three (3) program tracks, **Applied (Project) Track**, **Research (Thesis) Track** and the **Course Only Track**. For each track, there are three concentrations for students to choose. Students must complete 30 credit hours of MSDS courses with a minimum grade point average of 3.0 to earn the degree. All students must take the four (4) MSDS core courses with a minimum of grade of C. Students can transfer at most 6 credit hours of non-core courses from other colleges or universities.

### Applied (Project) Track

- Four (4) data science core courses: 12 credit hours
- Four (4) concentration courses: 12 credit hours

- CSCI 6574 Research Techniques: 3 credit hours
- CSCI 6598 Special Project: 3 credit hours

### Research (Thesis) Track

- Four (4) data science core courses: 12 credit hours
- Four (4) concentration courses: 12 credit hours
- CSCI 6574 Research Techniques: 3 credit hours
- CSCI 6601 Thesis: 3 credit hours

### Course Only Track

Students who select the Course Only track must successfully complete a total of 30 credit hours.

- Four (4) data science core courses: 12 credit hours
- Four (4) concentration courses: 12 credit hours
- CSCI 6574 Research Techniques : 3 credit hours
- One CSIT graduate course: 3 credit hours

## English Proficiency Requirement

Those applicants whose native language is not English or whose language of college instruction was not English are required to submit English Language proficiency scores.

- **Test of English as a Foreign Language (TOEFL):** 78 total on the internet-based TOEFL (ibt) or 550+ on the paper-based TOEFL
- **International English Language Testing System (IELTS):** Minimum scores of 6 total
- **Duolingo English Test:** Minimum score of 100

Applicants whose language of instruction was English should have the Registrar of their home institution submit a letter to Graduate Admissions attesting/certifying that the language of instruction for the baccalaureate degree was English. If this documentation is unavailable, applicants must submit the official acceptable scores on the TOEFL, IELTS or Duolingo.

## Program Requirements

The curriculum is generally delivered over three semesters when students follow the planned sequence. All students must take the four MSDS core courses with a minimum grade of C.

Code	Title	Credit Hours
<b>Required MSDS Core Courses</b> <sup>1</sup>		<b>12</b>
CSCI 5101	Foundations of Information Systems Security and Ethics	3
CSCI 5112	System Analysis & Design	3
CSCI 5201	Database Theory and Design	3
CSCI 5317	Operating Systems Administration and Security	3
<b>Concentration Requirements</b> <sup>3</sup>		<b>18</b>
Choose one concentration from the following:		
	Data Management and Intelligence	
	Knowledge and Information Systems	
	Health Informatics	
<b>Total Credit Hours</b>		<b>30</b>

## DATA MANAGEMENT AND INTELLIGENCE CONCENTRATION (Applied)

Code	Title	Credit Hours
<b>MSDS Required Core Courses</b> <sup>1</sup>		<b>12</b>
<b>Data Management and Intelligence Concentration (Applied) Requirements</b>		<b>18</b>
CSCI 6574	Research Techniques	
CSCI 6598	Special Project	
Choose 4 courses from the following (12 credit hours):		
CSCI 6201	Data Management for Analytics	
CSCI 6202	Data Mining and Data Warehousing	
CSCI 6307	Foundation of Artificial Intelligence and Deep Learning	
CSCI 6308	Cloud Computing	
CSCI 6433	Web Application Development	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## DATA MANAGEMENT AND INTELLIGENCE CONCENTRATION (Research)

Code	Title	Credit Hours
<b>MSDS Required Core Courses</b> <sup>1</sup>		<b>12</b>
<b>Data Management and Intelligence Concentration (Research) Requirements</b> <sup>3</sup>		<b>18</b>
CSCI 6574	Research Techniques	
CSCI 6601	Thesis	
Choose 4 courses (12 credit hours) from the following:		
CSCI 6201	Data Management for Analytics	
CSCI 6202	Data Mining and Data Warehousing	
CSCI 6307	Foundation of Artificial Intelligence and Deep Learning	
CSCI 6308	Cloud Computing	
CSCI 6433	Web Application Development	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## KNOWLEDGE AND INFORMATION SYSTEMS CONCENTRATION (Applied)

Code	Title	Credit Hours
<b>MSDS Required Core Courses</b> <sup>1</sup>		<b>12</b>
<b>Knowledge and Information Systems Concentration (Applied) Requirements</b> <sup>3</sup>		<b>18</b>
CSCI 6574	Research Techniques	
CSCI 6598	Special Project	
Choose 4 courses from the following (12 credit hours):		
CSCI 6012	Information Risk Management	
CSCI 6307	Foundation of Artificial Intelligence and Deep Learning	
CSCI 6433	Web Application Development	
CSCI 6812	Data Science	
CSCI 6820	Knowledge Engineering	

CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## KNOWLEDGE AND INFORMATION SYSTEMS CONCENTRATION (Research)

Code	Title	Credit Hours
<b>MSDS Required Core Courses <sup>1</sup></b>		<b>12</b>
<b>Knowledge and Information Systems Concentration (Research) Requirements <sup>3</sup></b>		<b>18</b>
CSCI 6574	Research Techniques	
CSCI 6601	Thesis	
Choose 4 courses (12 credit hours) from the following:		
CSCI 6012	Information Risk Management	
CSCI 6307	Foundation of Artificial Intelligence and Deep Learning	
CSCI 6433	Web Application Development	
CSCI 6812	Data Science	
CSCI 6820	Knowledge Engineering	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## HEALTH INFORMATICS CONCENTRATION (Applied)

Code	Title	Credit Hours
<b>MSDS Required Core Courses <sup>1</sup></b>		<b>12</b>
<b>Health Informatics Concentration (Applied) Requirements <sup>3</sup></b>		<b>18</b>
CSCI 6574	Research Techniques	
CSCI 6598	Special Project	
Choose 4 courses from the following (12 credit hours):		
CSCI 6443	Digital Transformation	
CSCI 6710	Health Care Analytics and Applications	
CSCI 6701	Introduction to Health Informatics	
CSCI 6705	Foundations of Clinical Processes and Workflows	
HCMG 5100	Health Systems Administration	
HCMG 6100	Information Mgmt.-Health Care	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## HEALTH INFORMATICS CONCENTRATION (Research)

Code	Title	Credit Hours
<b>MSDS Required Core Courses <sup>1</sup></b>		<b>12</b>
<b>Health Informatics Concentration (Research) Requirements <sup>3</sup></b>		<b>18</b>
CSCI 6574	Research Techniques	
CSCI 6601	Thesis	
Choose 4 courses (12 credit hours) from the following:		
CSCI 6443	Digital Transformation	
CSCI 6710	Health Care Analytics and Applications	
CSCI 6701	Introduction to Health Informatics	
CSCI 6705	Foundations of Clinical Processes and Workflows	
HCMG 5100	Health Systems Administration	
HCMG 6100	Information Mgmt.-Health Care	

CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## DATA MANAGEMENT AND INTELLIGENCE CONCENTRATION (course only)

Code	Title	Credit Hours
<b>MSDS Required Core Courses <sup>1</sup></b>		<b>12</b>
<b>Data Management and Intelligence Concentration (Course Only) Requirements</b>		<b>18</b>
CSCI 6574	Research Techniques	
One CSIT graduate course (3 credit hours)		
Choose 4 courses from the following (12 credit hours):		
CSCI 6201	Data Management for Analytics	
CSCI 6202	Data Mining and Data Warehousing	
CSCI 6307	Foundation of Artificial Intelligence and Deep Learning	
CSCI 6308	Cloud Computing	
CSCI 6433	Web Application Development	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## KNOWLEDGE AND INFORMATION SYSTEMS CONCENTRATION (course only)

Code	Title	Credit Hours
<b>MSDS Required Core Courses <sup>1</sup></b>		<b>12</b>
<b>Knowledge and Information Systems Concentration (Course Only) Requirements <sup>3</sup></b>		<b>18</b>
CSCI 6574	Research Techniques	
One CSIT graduate course (3 credit hours)		
Choose 4 courses from the following (12 credit hours):		
CSCI 6012	Information Risk Management	
CSCI 6307	Foundation of Artificial Intelligence and Deep Learning	
CSCI 6433	Web Application Development	
CSCI 6812	Data Science	
CSCI 6820	Knowledge Engineering	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

## HEALTH INFORMATICS CONCENTRATION (course only)

Code	Title	Credit Hours
<b>MSDS Required Core Courses <sup>1</sup></b>		<b>12</b>
<b>Health Informatics Concentration (Course Only) Requirements <sup>3</sup></b>		<b>18</b>
CSCI 6574	Research Techniques	
One CSIT graduate course (3 credit hours)		
Choose 4 courses from the following (12 credit hours):		
CSCI 6443	Digital Transformation	
CSCI 6710	Health Care Analytics and Applications	
CSCI 6701	Introduction to Health Informatics	
CSCI 6705	Foundations of Clinical Processes and Workflows	
HCMG 5100	Health Systems Administration	

HCMG 6100	Information Mgmt.-Health Care	
CSCI 6093	Advanced Topics in Information Systems	
<b>Total Credit Hours</b>		<b>30</b>

<sup>1</sup> All students must take the four (4) MSDS core courses totaling 12 credit hours. A minimum grade of C is required for the four core courses.

<sup>2</sup> **Students must select one of three program tracks, the Applied (Project) Track, the Research (Thesis) Track, or the Course Only Track.**

- Students selecting the Applied (Project) Track must complete CSCI 6574 (<https://clayton-preview.courseleaf.com/search/?P=CSCI%206574>) Research Techniques (3 credit hours) and CSCI 6599 (<https://clayton-preview.courseleaf.com/search/?P=CSCI%206599>) Special Project (3 credit hours).
- Students selecting the Research (Thesis) Track must complete CSCI 6574 (<https://clayton-preview.courseleaf.com/search/?P=CSCI%206574>) Research Techniques (3 credit hours) and CSCI 6600 (<https://clayton-preview.courseleaf.com/search/?P=CSCI%206600>) Thesis (3 credit hours).
- Students selecting the Course Only Track must complete CSCI 6574 Research Techniques (3 credit hours) and an additional CSIT graduate course (3 credit hours).

<sup>3</sup> Concentration Requirements: Student must choose one of the three concentrations and take 4 courses (12 credit hours) within one of the concentration options

## Faculty

Shakil Akhtar, Professor  
 Xiangdong An, Assistant Professor  
 Shuju Bai, Professor  
 Byron Jeff, Associate Professor  
 Ebrahim Khosravi, Professor  
 Ken Nguyen, Professor  
 Junfeng Qu, Professor  
 Muhammad Rahman, Professor