

Computational Data Science MS

COLLEGE OF SCIENCE AND TECHNOLOGY

Learn more about the Master of Science in Computational Data Science.

About the Program

Data science is a multifaceted, interdisciplinary field that employs techniques and theories drawn from the broad areas of computer and information science, mathematics and statistics, and applies them to a wide range of data-rich domains such as biomedical science, business, education, engineering, geoscience, physical science and social science. The MS in Computational Data Science is designed for students interested in developing expertise in data science with a specialization in computational analytics. The goal is to enable students to analyze large quantities of data to discover new knowledge and facilitate decision-making. To accomplish this, the program provides students with a strong foundation in big data management and analysis; algorithmic, computational and statistical thinking; and an understanding of computer systems.

Time Limit for Degree Completion: 5 years

Campus Location: Main

Full-Time/Part-Time Status: Students complete the degree program through classes offered after 4:30 p.m. The degree program can be completed on a full- or part-time basis.

Areas of Specialization: Research interests of faculty include:

- Analysis of algorithms
- Artificial intelligence
- Communication and networks
- Computer architecture
- Data analytics
- Digital forensics
- Expert systems
- Flexible and intelligent manufacturing systems
- Graphics
- High-performance computing
- Information security and assurance
- Intelligent CAI systems
- Management information and database systems
- Natural language processing
- Network security
- Parallel and distributive processing and operating systems
- Programming languages
- Sensory and image processing
- Software engineering
- Theory of automata and computation
- Wired and wireless networks

Job Prospects: Graduates gain the necessary skills to find positions in the data science field requiring a mix of data analysis skills, the ability to deal with large quantities of data, and a strong foundation in computer science. Graduates are also prepared to undertake doctoral studies, either to deepen their overall data science expertise or learn how to better use their analytics skills in a particular data-rich domain.

Non-Matriculated Student Policy: Non-matriculated students are permitted to take a maximum of two graduate-level CIS courses.

Financing Opportunities: Assistantships provide a stipend and full-time tuition to qualified students, but are typically reserved for doctoral students.

Admission Requirements and Deadlines

Application Deadline:

Fall Priority Deadline: March 1; December 15 international

Spring Priority Deadline: October 30; August 1 international

Applications submitted after the priority deadline will be considered for admission on a rolling basis. Applications are reviewed as they are received.

APPLY ONLINE to this graduate program.

Letters of Reference:

Number Required: 2

From Whom: Letters of recommendation should be obtained from Computer Science faculty and professionals.

Coursework Required for Admission Consideration: A minimum of one year of programming and data structures using the C++ or Java programming language and one year of theoretical calculus are required. This includes coursework equivalent to CIS 1068 Program Design and Abstraction, CIS 2168 Data Structures, MATH 1041 Calculus I, and MATH 1042 Calculus II.

Bachelor's Degree in Discipline/Related Discipline: A baccalaureate degree in Computer Science is required. Applicants who have insufficient undergraduate coursework in Computer Science will need to take undergraduate courses to address any deficiencies. Students without a Computer Science degree are typically required to take the following courses, which cannot be counted for credit toward the MS degree:

Code	Title	Credit Hours
CIS 2107	Computer Systems and Low-Level Programming	4
CIS 2166	Mathematical Concepts in Computing II	4
CIS 2168	Data Structures	4
CIS 3207 or CIS 5012	Introduction to Systems Programming and Operating Systems System Software and Operating Systems	3-4
CIS 3223 or CIS 5011	Data Structures and Algorithms Programming and Data Structure	3

Statement of Goals: In approximately 500 to 1,000 words, describe your specific interest in Temple's program, research goals, future career goals, and academic and research achievements.

Standardized Test Scores:

GRE: Not required

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 85
- IELTS Academic: 6.5
- PTE Academic: 58
- Duolingo: 110

Resume: Current resume required.

Transfer Credit: Graduate-level Computer Science coursework completed no more than five years prior to the student's matriculation in the graduate program may be transferred into the Computational Data Science MS program. The student must have earned an "A" in the course, and must submit a rationale for applying the credits to the current graduate program. The maximum number of credits a student may transfer is 6.

Program Requirements

General Program Requirements:

Number of Credits Required Beyond the Baccalaureate: 30

Required Courses:

Code	Title	Credit Hours
Core Courses		
CIS 5511	Programming Techniques	3
CIS 5515	Design and Analysis of Algorithms	3
CIS 5526	Machine Learning	3
Select one from the following:		3
CIS 5512	Operating Systems	

CIS 5516	Principles of Data Management	
CIS 5642	Computer Architecture	
Electives		15-12
Select at most three Big Data courses from the following:		
CIS 5512	Operating Systems ¹	
CIS 5516	Principles of Data Management ¹	
CIS 5517	Data-Intensive and Cloud Computing	
CIS 5590	Topics in Computer Science ²	
CIS 5642	Computer Architecture ¹	
CIS 5643	Emerging Storage Systems and Technologies	
CIS 5644	Distributed Systems	
CIS 9665	Advanced Topics in Data Base Systems	
Select at most three Data Analysis courses from the following:		
CIS 5523	Knowledge Discovery and Data Mining	
CIS 5524	Analysis and Modeling of Social and Information Networks	
CIS 5525	Neural Computation	
CIS 5535	Probabilistic Graph Models	
CIS 5538	Text Mining and Language Processing	
CIS 5543	Computer Vision	
CIS 5603	Artificial Intelligence	
Select at most two Statistics and domain-related courses ²		
Select at most one CIS course numbered less than 5500 ²		
Select at most three credits of Independent Study:		
CIS 9282	Independent Study ²	
Capstone Course		
CIS 9995	Capstone Project	3-6
or CIS 9996	Master's Thesis Research	
Total Credit Hours		30

¹ Course may be selected as an elective if not taken as a core course above.
² Selection of any of these courses requires approval from the student's advisor.

Culminating Event:

Capstone Project:

Under the close supervision of CIS graduate faculty, students complete a capstone project as the culminating event. CIS 9995 Capstone Project is taken for only 3 credits. Students who choose to complete a master's thesis must take 6 credits of CIS 9996 Master's Thesis Research for the capstone.

Accelerated Programs

Undergraduate students may opt to pursue an accelerated +1 program, enabling them to complete both a bachelor's degree and master's degree in less time than the traditional route.

The accelerated pathway for the Computational Data Science MS is open to students pursuing one of the following programs:

- Computer Science BS
- Data Science BS with Computational Analytics concentration
- Mathematics and Computer Science BS

Cohort Code: XMSCDS

Minimum Cumulative GPA: 3.25

Graduate Courses Approved to Count for Both Undergraduate and Graduate Degrees

Code	Title	Credit Hours
CIS 5511	Programming Techniques	3
Select two or three from the following		6-9
CIS 5512	Operating Systems	
CIS 5515	Design and Analysis of Algorithms	
CIS 5516	Principles of Data Management	
CIS 5526	Machine Learning	
CIS 5642	Computer Architecture	

Suggested Academic Plans

For students pursuing Computer Science BS or Data Science BS

Course	Title	Credit Hours
Year 3		
Spring		
CIS 5511	Programming Techniques ¹	3
Credit Hours		3
Year 4		
Fall		
Select two of the following:		6
CIS 5511	Programming Techniques ¹	
CIS 5512	Operating Systems	
CIS 5526	Machine Learning	
CIS 5642	Computer Architecture	
Credit Hours		6
Spring		
Select one of the following:		3
CIS 5515	Design and Analysis of Algorithms ²	
CIS 5516	Principles of Data Management ²	
Credit Hours		3
Total Credit Hours		12

¹ CIS 5511 must be completed in Junior or Senior year. However, in order to take 4 Graduate courses, CIS 5511 must be taken in the spring of the Junior year.

² Only if CIS 5511 has been satisfied

For students pursuing Mathematics and Computer Science BS

Course	Title	Credit Hours
Year 3		
Spring		
CIS 5511	Programming Techniques ¹	3
Credit Hours		3
Year 4		
Fall		
Select one of the following:		3
CIS 5511	Programming Techniques ¹	
CIS 5512	Operating Systems	
CIS 5526	Machine Learning	
CIS 5642	Computer Architecture	
Credit Hours		3

Spring		
CIS 5515	Design and Analysis of Algorithms ²	3
CIS 5516	Principles of Data Management ²	3
Credit Hours		6
Total Credit Hours		12

¹ CIS 5511 must be completed in the Junior or Senior year. However, in order to take 4 Graduate courses, CIS 5511 must be taken in the spring of the Junior year.

² Only if CIS 5511 has been satisfied

Admissions Criteria

Candidates for the +1 program must:

- apply during the spring semester of sophomore year or prior to the start of senior year.
- have a 3.25 undergraduate GPA before approval.
- have two faculty members submit a letter of recommendation to cst.gi@temple.edu.
- complete the remaining credits for the master's in the year following undergraduate graduation.

Application: <https://cst.temple.edu/admissions/graduate-admissions>

Contact Information

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andrew.rosen@temple.edu

Learn more about the accelerated program in Computational Data Science and other College of Science and Technology +1 programs.

Contacts

Program Web Address:

<https://www.temple.edu/academics/degree-programs/computational-data-science-ms-st-cds-ms>

Department Information:

Dept. of Computer and Information Sciences
 313 Science and Education Research Center
 1925 N. 12th Street
 Philadelphia, PA 19122-1801
cisadmit@temple.edu
 215-204-8450

Submission Address for Application Materials:

<https://cst.temple.edu/academics/graduate-programs/apply-now>

Department Contacts:

Admissions:

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 215-204-8450

Graduate Advisor:

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Graduate Chairperson:

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