Computational Data Science, M.S.

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 M.S. 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: January 15
Spring: November 11; August 1 international
Applications are reviewed as they are received. Late applications may be considered for admission.

APPLY ONLINE to this graduate program.

Letters of Reference:
Number Required: 3

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. If the applicant has insufficient undergraduate coursework in Computer Science, s/he 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 M.S. degree:

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

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: Required. Scores should be in the 75th percentile on the quantitative section and 25th percentile on the verbal section. Most students submit scores far above the minimums.

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
- Duolingo: 110
- PTE Academic: 58

Resume: Current resume required.

Transfer Credit: Graduate-level Computer Science coursework obtained no more than five years prior to the student's matriculation in the graduate program may be transferred into the Computational Data Science M.S. 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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CIS 5511</td>
<td>Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5515</td>
<td>Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5526</td>
<td>Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one from the following:</td>
<td></td>
</tr>
<tr>
<td>CIS 5512</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
</tbody>
</table>
## Electives

Select at most three Big Data courses from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 5512</td>
<td>Operating Systems</td>
<td>1</td>
</tr>
<tr>
<td>CIS 5516</td>
<td>Principles of Data Management</td>
<td>1</td>
</tr>
<tr>
<td>CIS 5517</td>
<td>Data-Intensive and Cloud Computing</td>
<td></td>
</tr>
<tr>
<td>CIS 5590</td>
<td>Topics in Computer Science</td>
<td>2</td>
</tr>
<tr>
<td>CIS 5642</td>
<td>Computer Architecture</td>
<td>1</td>
</tr>
<tr>
<td>CIS 5643</td>
<td>Emerging Storage Systems and Technologies</td>
<td></td>
</tr>
<tr>
<td>CIS 5644</td>
<td>Distributed Systems</td>
<td></td>
</tr>
<tr>
<td>CIS 9665</td>
<td>Advanced Topics in Data Base Systems</td>
<td></td>
</tr>
</tbody>
</table>

Select at most three Data Analysis courses from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CIS 5523</td>
<td>Knowledge Discovery and Data Mining</td>
<td></td>
</tr>
<tr>
<td>CIS 5524</td>
<td>Analysis and Modeling of Social and Information Networks</td>
<td></td>
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<tr>
<td>CIS 5525</td>
<td>Neural Computation</td>
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<tr>
<td>CIS 5535</td>
<td>Probabilistic Graph Models</td>
<td></td>
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<tr>
<td>CIS 5538</td>
<td>Text Mining and Language Processing</td>
<td></td>
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<tr>
<td>CIS 5543</td>
<td>Computer Vision</td>
<td></td>
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<tr>
<td>CIS 5603</td>
<td>Artificial Intelligence</td>
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</tbody>
</table>

Select at most two Statistics and domain-related courses

Select at most one CIS course numbered less than 5500

Select at most three credits of Independent Study:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 9282</td>
<td>Independent Study</td>
<td>2</td>
</tr>
</tbody>
</table>

## Capstone Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 9995</td>
<td>Capstone Project</td>
<td>3</td>
</tr>
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</table>

## Total Credit Hours

30

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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.

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### Culminating Event:

**Capstone Project:**

Students complete a capstone project in data science as the culminating event. CIS 9995 is taken for 3 credits under the close supervision of CIS Graduate Faculty.

### 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:  
Graduate Administrative Coordinator  
cisadmit@temple.edu
Computational Data Science, M.S.

215-204-8450

Graduate Advisor:
Tony Hughes
anthony.hughes@temple.edu
215-204-7910

Graduate Chairperson:
Yu Wang
wangyu@temple.edu
215-204-4187

Department Chairperson:
Jamie Payton
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