Computational Data Science, M.S.

COLLEGE OF SCIENCE AND TECHNOLOGY (http://cst.temple.edu)

About the Program

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. Data science is a multifaceted, interdisciplinary discipline 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.

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: December 15
Spring: August 1

Applications are reviewed as they are received and can sometimes be considered after the deadline.
Computational Data Science, M.S.

**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>Course</th>
<th>Title</th>
<th>Credits</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>
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</tbody>
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**Statement of Goals:** Approximately 500 to 1,000 words include your specific interest in Temple's program, your research goals, your future career goals, and your 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.

For applicants whose native language is not English, the TOEFL, IELTS, or PTE Academic exam is required:

TOEFL: 85 iBT or 563 PBT minimum

IELTS: 7.0 minimum

PTE Academic: 58 minimum

**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>Core Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CIS 5511 Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5526 Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>CIS 9615 Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one course from the following:

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS 5512</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CIS 5516</td>
<td>Principles of Data Management</td>
<td></td>
</tr>
<tr>
<td>CIS 5642</td>
<td>Computer Architecture</td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

Select at most three Data Analysis courses from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>CIS 5524</td>
<td>Analysis and Modeling of Social and Information Networks</td>
</tr>
<tr>
<td>CIS 5525</td>
<td>Neural Computation</td>
</tr>
</tbody>
</table>
CIS 5535  Probabilistic Graph Models
CIS 5538  Text Mining and Language Processing
CIS 5543  Computer Vision
CIS 5603  Artificial Intelligence
CIS 9664  Knowledge Discovery and Data Mining

Select at most three Big Data courses from the following:
CIS 5512  Operating Systems 1
CIS 5516  Principles of Data Management 1
CIS 5590  Topics in Computer Science 2
CIS 5642  Computer Architecture 1
CIS 5644  Distributed Systems
CIS 9665  Advanced Topics in Data Base Systems

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  Master Research in IS&T 3

Total Credit Hours 30

1  May be selected as an elective if not taken as a core course above.
2  Requires approval from the student's advisor.

Culminating Events:
Master's Research Project:
Students complete a master's research 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:
http://www.temple.edu/cis/graduate/

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

Mailing Address for Application Materials:
Dept. of Computer and Information Sciences
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1925 N. 12th Street
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