DATA SCIENCE - M.S.

College of Arts and Sciences
Department of Mathematical Sciences
Department of Computer Science
www.kent.edu/math

Contact Information
• Program Coordinator: Hassan Peyravi | gradinfo@cs.kent.edu | 330-672-9047
• Chat with an Admissions Counselor

Fully Offered
• Delivery: In person
• Location: Kent Campus

Examples of Possible Careers*
Data scientists and mathematical science occupations, all other
• 30.9% much faster than the average
• 33,200 number of jobs
• $98,230 potential earnings

Computer and information research scientists
• 15.4% much faster than the average
• 32,700 number of jobs
• $126,830 potential earnings

Statisticians
• 34.6% much faster than the average
• 42,700 number of jobs
• $92,270 potential earnings

Computer and information systems managers
• 10.4% much faster than the average
• 461,000 number of jobs
• $151,150 potential earnings

Management analysts
• 10.7% much faster than the average
• 876,300 number of jobs
• $87,660 potential earnings

Database administrators and architects
• 9.7% much faster than the average
• 132,500 number of jobs
• $98,860 potential earnings

Computer programmers
• -9.4% decline
• 213,900 number of jobs
• $89,190 potential earnings

Software developers and software quality assurance analysts and testers
• 21.5% much faster than the average
• 1,469,200 number of jobs
• $110,140 potential earnings

*Note
Source of occupation titles and labor data is from the U.S. Bureau of Labor Statistics’ Occupational Outlook Handbook. Data comprises projected percent change in employment over the next 10 years; nation-wide employment numbers; and the yearly median wage at which half of the workers in the occupation earned more than that amount and half earned less.

Description
The Master of Science degree in Data Science provides a focus on developing scientists who will understand the theories, methods and tools of data science and apply data science to solving research and workplace questions in the natural, health and social sciences for businesses and industries.

Data science is a STEM discipline founded on the principles of mathematics and the sciences and developed through a synthesis of mathematics and computer science. One may think of data science as a blending together of methods and ideas from analysis, statistics, databases, big data, artificial intelligence, numerical analysis, graph theory and visualization for the purposes of finding information in data and applying that information to solving real-world problems.

Admission Requirements
• Bachelor’s degree from an accredited college or university
• Minimum 3.000 undergraduate GPA (on a 4.000 point scale)
• Prerequisite mathematics and computer science courses
• Official transcript(s)
• Two letters of recommendation
• English language proficiency - all international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning one of the following:
  • Minimum 525 TOEFL PBT score (paper-based version)
  • Minimum 71 TOEFL IBT score (Internet-based version)
  • Minimum 74 MELAB score
  • Minimum 6.0 IELTS score
  • Minimum 50 PTE score
  • Minimum 100 Duolingo English test score

For more information about graduate admissions, visit the graduate admission website. For more information on international admission, visit the Office of Global Education’s admission website.

1 Students entering the program are expected to have previously completed courses in linear algebra (equivalent to MATH 21001 or MATH 21002), statistics (equivalent to MATH 20011), advanced calculus (equivalent to MATH 22005), discrete mathematics/structures
(equivalent to MATH 31011 or CS 23022), programming and data structures (equivalent to CS 23001) and database systems (equivalent to CS 33007). Applicants have not completed all the prerequisite courses may be admitted conditionally (based on a wholistic review of their application) until they complete the remaining courses being before beginning the program’s coursework.

**Program Learning Outcomes**

Graduates of this program will be able to:

1. Ask the questions so that problems in a particular business or industrial situation become clear.
2. Determine if the problem may be addressed with data science methods and tools, and if yes, propose potential methods for solving the problems.
3. Make suggestions for how data science may be used to enhance the quality and value of currently existing products (whether the products are physical or methods) and how data science may be used in the development of new products.

**Program Requirements**

**Major Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CS 63005</td>
<td>ADVANCED DATABASE SYSTEMS DESIGN</td>
<td>3</td>
</tr>
<tr>
<td>CS 63015</td>
<td>DATA MINING TECHNIQUES</td>
<td>3</td>
</tr>
<tr>
<td>CS 63016</td>
<td>BIG DATA ANALYTICS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 50015</td>
<td>APPLIED STATISTICS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 50024</td>
<td>COMPUTATIONAL STATISTICS</td>
<td>3</td>
</tr>
<tr>
<td>MATH 50028</td>
<td>STATISTICAL LEARNING</td>
<td>3</td>
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Major Electives, choose from the following: 6

- BSCI 60104 | BIOLOGICAL STATISTICS
- CS 54201  | ARTIFICIAL INTELLIGENCE
- CS 57206  | DATA SECURITY AND PRIVACY
- CS 63017  | BIG DATA MANAGEMENT
- CS 63018  | PROBABILISTIC DATA MANAGEMENT
- CS 63100  | COMPUTATIONAL HEALTH INFORMATICS
- CS 64201  | ADVANCED ARTIFICIAL INTELLIGENCE
- CS 64402  | MULTIMEDIA SYSTEMS AND BIOMETRICS
- CS 67302  | INFORMATION VISUALIZATION
- CS 69098  | RESEARCH
- or MATH 67098 | RESEARCH
- ECON 62054 | ECONOMETRICS I
- ECON 62055 | ECONOMETRICS II
- ECON 62056 | TIME SERIES ANALYSIS
- EHS 52018 | ENVIRONMENTAL HEALTH CONCEPTS IN PUBLIC HEALTH
- EPI 52017 | FUNDAMENTALS OF PUBLIC HEALTH EPIDEMIOLOGY
- EPI 63016 | PRINCIPLES OF EPIDEMIOLOGIC RESEARCH
- EPI 63018 | OBSERVATIONAL DESIGNS FOR CLINICAL RESEARCH
- EPI 63019 | EXPERIMENTAL DESIGNS FOR CLINICAL RESEARCH
- GEOG 59070 | GEOGRAPHIC INFORMATION SCIENCE

**Graduation Requirements**

The culminating experience requirement is a master’s thesis or an integrated learning experience.

The master’s thesis requires a written thesis, a public defense of the thesis and approval by the student’s supervisory committee. Students must form a master’s thesis committee, which will include the advisor and at least two other graduate faculty members. The thesis topic and committee must be approved by the advisor and graduate coordinator. The final version of the thesis must be approved by the advisor, thesis committee, and graduate coordinator.

The integrated learning experience may include a substantial capstone project or a capstone project and internship. Students must prepare a written document explaining and/or demonstrating their capstone project or internship activity and its significance. In addition, students must give a public presentation of their capstone project or internship, and the written document and presentation must be approved by their supervisory committee.

**Roadmap**

This roadmap is a recommended semester-by-semester plan of study for this major. However, courses designated as critical (!) must be completed in the semester listed to ensure a timely graduation.

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<thead>
<tr>
<th>Semester One</th>
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| Credit Hours | 9 |

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<th>Semester Two</th>
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<tr>
<td></td>
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**Minimum Total Credit Hours:** 30