DATA SCIENCE - M.S.

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

About This Program
The Data Science M.S. program provides you with the theoretical knowledge and practical experience needed to succeed in today’s data-driven world. With hands-on learning opportunities, experienced faculty and cutting-edge technology, you’ll be prepared to solve complex data challenges and make an impact in your field. Read more...

Contact Information
- Program Coordinator: Hassan Peyravi | gradinfo@cs.kent.edu | 330-672-9047
- Connect with an Admissions Counselor: U.S. Student | International Student

Program Delivery
- Delivery:
  - In person
- Location:
  - Kent Campus

Examples of Possible Careers and Salaries*

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

* Source of occupation titles and labor data comes 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.

For more information about graduate admissions, visit the graduate admission website. For more information on international admissions, visit the international admission website.

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)
- Effective for fall 2024 admission term, GRE scores will be required
- 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
  - Minimum 71 TOEFL IBT score
  - Minimum 74 MELAB score
  - Minimum 6.0 IELTS score
  - Minimum 50 PTE score
  - Minimum 100 Duolingo English score

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.

Application Deadlines

- **Fall Semester**
  - Application deadline: June 15
- **Spring Semester**
  - Application deadline: November 1
- **Summer Term**
  - Application deadline: April 1

Applications submitted after these deadlines will be considered on a space-available basis.

Program Requirements

Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</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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</table>

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  PROBABILITY 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
- GEOG 59080  ADVANCED GEOGRAPHIC INFORMATION SCIENCE
- HI 60401  HEALTH INFORMATICS MANAGEMENT
- HI 60411  CLINICAL ANALYTICS
- HI 60414  HUMAN FACTORS AND UsABILITY IN HEALTH INFORMATICS
- HI 60418  CLINICAL ANALYTICS II

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<tr>
<td>KM 60301</td>
<td>FOUNDATIONAL PRINCIPLES OF KNOWLEDGE MANAGEMENT</td>
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<td>LIS 60020</td>
<td>INFORMATION ORGANIZATION</td>
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<tr>
<td>MATH 50011</td>
<td>PROBABILITY THEORY AND APPLICATIONS</td>
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<td>MATH 50051</td>
<td>TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES</td>
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<tr>
<td>MATH 50059</td>
<td>STOCHASTIC ACTUARIAL MODELS</td>
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<tr>
<td>PSYC 61651</td>
<td>QUANTITATIVE STATISTICAL ANALYSIS I</td>
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<tr>
<td>PSYC 61654</td>
<td>QUANTITATIVE STATISTICAL ANALYSIS II</td>
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Culminating Requirement

Choose from the following: 6

- DATA 69099  CAPSTONE PROJECT
- DATA 69099  CAPSTONE PROJECT & DATA 69192 and GRADUATE INTERNSHIP
- DATA 69199  THESIS I

Minimum Total Credit Hours: 30

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.

<table>
<thead>
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<tr>
<th>Semester Three</th>
<th>Credits</th>
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<tr>
<td>CS 63016  BIG DATA ANALYTICS</td>
<td>3</td>
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<tr>
<td>Major Elective</td>
<td>3</td>
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<tr>
<td><strong>Credit Hours</strong></td>
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</table>
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.

Full 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.