DATA SCIENCE - M.S.

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

Contact Information
• Program Coordinator:
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  330-672-9047
• Chat with an Admissions Counselor

Fully Offered
• Kent Campus

Admission Terms
• Fall
• Spring

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 an emerging 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 for unconditional admission
• Minimum 3.000 undergraduate GPA (on a 4.000 point scale) for unconditional admission
• Prerequisite mathematics and computer science courses ¹
• 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

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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<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>
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<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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Culminating Experience Requirement, choose from the following: 6

CS 69099 | CAPSTONE PROJECT
CS 69099 & CS 69192 | CAPSTONE PROJECT and GRADUATE INTERNSHIP
MATH 67199 | THESIS I
CS 69199 | THESIS I

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

For more information about graduate admissions, please visit the Graduate Studies website. For more information on international admission, visit the Office of Global Education 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.
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
KM 60301  FOUNDATIONAL PRINCIPLES OF KNOWLEDGE MANAGEMENT
LIS 60010  THE INFORMATION LANDSCAPE
LIS 60020  INFORMATION ORGANIZATION
MATH 50011  PROBABILITY THEORY AND APPLICATIONS
MATH 50051  TOPICS IN PROBABILITY THEORY AND STOCHASTIC PROCESSES
MATH 50059  STOCHASTIC ACTUARIAL MODELS
PSYC 61651  QUANTITATIVE STATISTICAL ANALYSIS I
PSYC 61654  QUANTITATIVE STATISTICAL ANALYSIS II

Minimum Total Credit Hours: 30

Graduation Requirements
The culminating experiences may be 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.

The integrated learning experience may include a substantial capstone project or a capstone project and internship. For either non-thesis option, 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.