COMPUTER SCIENCE - M.S.

College of Arts and Sciences
Department of Computer Science
241 Mathematics and Computer Science Building
Kent Campus
330-672-9980
depsec@cs.kent.edu
www.kent.edu/cs

Description
The Master of Science degree in Computer Science provide students with an educational and research environment to develop career paths through necessary training with emerging technologies. Graduates have the technical knowledge and skills necessary for success within the information and high technology industries.

The Computer Science major includes the following optional concentrations:

• The **Computational Data Science** concentration prepares students to process big data. In a spectrum of real-world applications, the collected data (from such sources as mobile devices, GPS, sensor/RFID networks, Internet, social media, etc.) is so large and complex, the traditional data processing tools cannot efficiently and effectively handle it. This concentration focuses on algorithms development, machine learning, computation techniques, network and computing infrastructure and software.

• The **Computer Engineering** concentration prepares students to meet the need of computer engineering professionals in the industry for designing and managing emerging smart devices and computer-integrated physical systems with programmable intelligence. Students learn the hardware-software co-design principles and theory, architecture of the associated software and hardware, devices and sensors communication protocols and the interfaces to effectively design, build and evolve such smart devices and computer-driven intelligent physical systems.

• The **Computer Security** concentration exposes students to a wide range of topics on the security of computer systems. Students study the vulnerabilities in software and networks and develop algorithms and software to protect data, using digital encryption coding, protected databases and protected computer networking techniques.

• The **Non-Thesis Option** concentration is available for students who do not plan to complete a PhD in Computer Science and, instead, are pursuing a professional career that does not involve research and desire an individualized plan of study.

Students who are seeking academic careers or positions in research and development may complete a thesis instead of selecting a concentration.

FULLY OFFERED AT:
• Kent Campus

Admission Requirements

• Official transcript(s)
• GRE scores
• Goal statement

**English Language Proficiency Requirements for International Students:** All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 525 TOEFL score (71 on the Internet-based version), minimum 74 MELAB score, minimum 6.0 IELTS score or minimum 50 PTE Academic score. For more information on international admission, visit the Office of Global Education’s admission website. **Effective spring 2018.**

For more information about graduate admissions, please visit the Graduate Studies website.

1 Prospective students must successfully have completed high-level algebra, geometry and calculus coursework (equivalent to the following Kent State courses: MATH 12002, MATH 12003, MATH 21001). In addition, it is strongly recommended that students successfully have completed coursework in computer science, including programming, data structures, abstraction, operating systems, combinatorial analysis and discrete structures, (equivalent to the following Kent State courses: CS 13001, CS 23001, CS 23022, CS 33211, CS 35101, CS 46101). Highly qualified students lacking preparation in certain standards areas may be admitted.

Program Learning Outcomes
Graduates of this program will be able to:

1. Demonstrate breadth-of-knowledge and understanding of essential facts, concepts, principles and theories relating to advanced topics in computer science.

2. Perform research, discovery and integration by applying advanced knowledge of computer science.

3. Conduct literature searches, comprehend advanced research materials and uncover connections between related works and critical evaluation and synthesis.

Program Requirements

**Major Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 69191</td>
<td>MASTER'S SEMINAR</td>
<td>2</td>
</tr>
<tr>
<td>Computer Science (CS) Electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Core Distribution Electives, choose one course each from four categories:</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Computational Data Science Category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See courses under Computational Data Science concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Engineering Category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See courses under Computer Engineering concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Security Category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See courses under Computer Security concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software and Application Category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 63005 Advanced Database Systems Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 63901 Software Engineering Methodologies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 63902 Software Evolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 64401 Image Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 67101 Advanced Computer Graphics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 67301 Scientific Visualization</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Theory and Algorithms Category**

- **CS 63301** PARALLEL AND DISTRIBUTED COMPUTING
- **CS 64201** ADVANCED ARTIFICIAL INTELLIGENCE
- **CS 64301** PATTERN RECOGNITION PRINCIPLES
- **CS 66101** ADVANCED TOPICS IN ALGORITHMS
- **CS 66105** PARALLEL AND DISTRIBUTED ALGORITHMS
- **CS 66110** COMPUTATIONAL GEOMETRY

**Thesis Option or Concentrations**

Choose from the following: 12

- Additional Requirements for Students Declaring Thesis Option
  - Computational Data Science
  - Computer Engineering
  - Computer Security
  - Non-Thesis Option

**Additional Requirements for Students Declaring Thesis Option**

[AS-MS-CS]

**Major Requirements**

- **CS 69098** RESEARCH 1 3
- **CS 69199** THESIS I 2 6
- Computer Science (CS) Elective 3

Minimum Total Credit Hours: 12

1. Maximum 3 credit hours of CS 69098 may be counted toward the degree; however, students are permitted to take the course multiple times.

2. Students selecting the thesis option must write and defend a suitable master's thesis for which 6 credit hours are earned in CS 69199. A master's thesis committee must be formed, which includes 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, committee and graduate coordinator.

**Computational Data Science Concentration Requirements**

[AS-MS-CS-CDSC]

**Concentration Requirements**

Concentration Electives, choose from the following: 12

- **CS 54001** COMPUTER SCIENCE III - PROGRAMMING PATTERNS
- **CS 54201** ARTIFICIAL INTELLIGENCE
- **CS 63005** ADVANCED DATABASE SYSTEMS DESIGN
- **CS 63015** DATA MINING TECHNIQUES
- **CS 63017** BIG DATA MANAGEMENT
- **CS 63018** PROBABILISTIC DATA MANAGEMENT NEW COURSE

Minimum Total Credit Hours: 12

**Computer Engineering Concentration Requirements**

[AS-MS-CS-CENG]

**Concentration Requirements**

Concentration Electives, choose from the following: 12

- **CS 53301** SOFTWARE DEVELOPMENT FOR ROBOTICS
- **CS 53305** ADVANCED DIGITAL DESIGN NEW COURSE
- **CS 63201** ADVANCED OPERATING SYSTEMS
- **CS 63304** CLUSTER COMPUTING
- **CS 63305** MULTICORE COMPUTING
- **CS 63306** EMBEDDED COMPUTING
- **CS 65101** ADVANCED COMPUTER ARCHITECTURE
- **CS 65202** ADVANCED COMMUNICATION NETWORKS
- **CS 65203** WIRELESS AND MOBILE COMMUNICATION NETWORKS
- **CS 65301** SYSTEM MODELING AND PERFORMANCE EVALUATION

Minimum Total Credit Hours: 12

**Computer Security Concentration Requirements**

[AS-MS-CS-CSEC]

**Concentration Requirements**

Concentration Electives, choose from the following: 12

- **CS 53202** SYSTEMS ADMINISTRATION
- **CS 53203** SYSTEMS PROGRAMMING
- **CS 55203** COMPUTER NETWORK SECURITY
- **CS 57205** INFORMATION SECURITY
- **CS 57206** DATA SECURITY AND PRIVACY NEW COURSE
- **CS 57221** INTRODUCTION TO CRYPTOLOGY

Minimum Total Credit Hours: 12

**Non-Thesis Option Concentration Requirements**

[AS-MS-CS-NTHS]

**Concentration Requirements**

Computer Science (CS) Electives 12

Minimum Total Credit Hours: 12

**Graduation Requirements**

Maximum 12 credit hours of 50000-level courses may be applied toward the degree.