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

- Résumé
- Three letters of recommendation
- Core components of an undergraduate computer science curriculum

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>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 69191</td>
<td>MASTER'S SEMINAR</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Computer Science (CS) Electives</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Core Distribution Electives, choose one course each from four categories:</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Computational Data Science Category</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See courses under Computational Data Science concentration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computer Engineering Category</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See courses under Computer Engineering concentration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computer Security Category</td>
<td></td>
</tr>
<tr>
<td></td>
<td>See courses under Computer Security concentration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Software and Application Category</td>
<td></td>
</tr>
<tr>
<td>CS 63005</td>
<td>ADVANCED DATABASE SYSTEMS DESIGN</td>
<td></td>
</tr>
<tr>
<td>CS 63901</td>
<td>SOFTWARE ENGINEERING METHODOLOGIES</td>
<td></td>
</tr>
<tr>
<td>CS 63902</td>
<td>SOFTWARE EVOLUTION</td>
<td></td>
</tr>
<tr>
<td>CS 64401</td>
<td>IMAGE PROCESSING</td>
<td></td>
</tr>
<tr>
<td>CS 67101</td>
<td>ADVANCED COMPUTER GRAPHICS</td>
<td></td>
</tr>
<tr>
<td>CS 67301</td>
<td>SCIENTIFIC VISUALIZATION</td>
<td></td>
</tr>
</tbody>
</table>

Effective spring 2018.
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

Minimum Total Credit Hours: 32

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 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

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.

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