

COMPUTER SCIENCE - M.S.

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

Contact Information

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

Fully Offered

- Kent Campus

Admission Terms

- Fall
- Spring
- Summer

Description

The Master of Science degree in Computer Science provides 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 M.S. degree in Computer Science has two culminating options: thesis or non-thesis. Students planning to pursue a Ph.D. degree and/or academic research should select the thesis option. Students planning to pursue applied research and development in industry may select the non-thesis option. The thesis option requires original research and a written thesis. The non-thesis option requires a capstone project and an optional industrial internship.

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.

Students opting to not pursue a concentration will create a 12-credit hour individualized plan of study with their advisor.

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
- Core components of an undergraduate computer science curriculum¹
- Official transcript(s)
- GRE scores
- Résumé
- Goal statement
- Three 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, please visit the Graduate Studies admission website. For more information on international admission, visit the Office of Global Education's admission 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, and 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, and 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. Conduct literature searches, comprehend advanced research materials and uncover connections between related work and critical evaluation and synthesis.
3. Perform research, discovery and integration by applying advanced knowledge of computer science.

Program Requirements

Major Requirements

Code	Title	Credit Hours
Major Requirements		
CS 69191	MASTER'S SEMINAR	2
Core Courses, choose one course each from four out of the five categories: ¹		12
<i>Computational Data Science Category</i>		
See courses under Computational Data Science concentration		
<i>Computer Engineering Category</i>		
See courses under Computer Engineering concentration		
<i>Computer Security Category</i>		
See courses under Computer Security concentration		
<i>Software and Application Category</i>		
CS 57201	HUMAN COMPUTER INTERACTION	
CS 63005	ADVANCED DATABASE SYSTEMS DESIGN	
CS 63100	COMPUTATIONAL HEALTH INFORMATICS	
CS 63901	SOFTWARE ENGINEERING METHODOLOGIES	
CS 63902	SOFTWARE EVOLUTION	
CS 64401	IMAGE PROCESSING	
CS 64402	MULTIMEDIA SYSTEMS AND BIOMETRICS	
CS 67101	ADVANCED COMPUTER GRAPHICS	
CS 67301	SCIENTIFIC VISUALIZATION	
CS 67302	INFORMATION VISUALIZATION	
<i>Theory and Algorithms Category</i>		
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	
Culminating Requirement, choose from the following:		6
CS 69099	CAPSTONE PROJECT (taken twice)	
CS 69099	CAPSTONE PROJECT	
& CS 69192	and GRADUATE INTERNSHIP ²	
CS 69199	THESIS I ³	
Additional Requirements or Concentrations		
Choose from the following:		12
Additional Requirements for Students Not Declaring a Concentration		
Computational Data Science Concentration		
Computer Engineering Concentration		
Computer Security Concentration		
Minimum Total Credit Hours:		32

Additional Requirements for Students Not Declaring a Concentration

Code	Title	Credit Hours
Major Requirements		
Computer Science (CS) Electives		12
Minimum Total Credit Hours:		12

Computational Data Science Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements		
Concentration Electives, choose from the following:		12
CS 54001	COMPUTER SCIENCE III - PROGRAMMING PATTERNS	
CS 54201	ARTIFICIAL INTELLIGENCE	
CS 54202	MACHINE LEARNING AND DEEP LEARNING	
CS 63005	ADVANCED DATABASE SYSTEMS DESIGN	
CS 63015	DATA MINING TECHNIQUES	
CS 63016	BIG DATA ANALYTICS	
CS 63017	BIG DATA MANAGEMENT	
CS 63018	PROBABILISTIC DATA MANAGEMENT	
Minimum Total Credit Hours:		12

Computer Engineering Concentration Requirements

Code	Title	Credit Hours
Concentration Requirements		
Concentration Electives, choose from the following:		12
CS 53301	SOFTWARE DEVELOPMENT FOR ROBOTICS	
CS 53302	ALGORITHMIC ROBOTICS	
CS 53303	INTERNET OF THINGS	
CS 53305	ADVANCED DIGITAL DESIGN	
CS 53334	HUMAN-ROBOT INTERACTION	
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

Code	Title	Credit Hours
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	
CS 57207	DIGITAL FORENSICS	
CS 57221	INTRODUCTION TO CRYPTOLOGY	
Minimum Total Credit Hours:		12

¹ Courses taken for the core cannot be counted again as an elective or concentration course. The list of courses offered each semester, including department-approved special topics, is available in the department's graduate office.

- ² Students may complete a capstone-related elective course in place of an internship with approval from the graduate coordinator.
- ³ Students selecting the thesis option 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.

Graduation Requirements

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