

COMPUTER SCIENCE - M.S.

College of Arts and Sciences

Department of Computer Science
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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.

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

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

Fully Offered At:

- Kent Campus

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

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. 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 work and critical evaluation and synthesis.

Program Requirements

Major Requirements

Code	Title	Credit Hours
Major Requirements		
CS 69191	MASTER'S SEMINAR	2
Computer Science (CS) Electives		6
Core Distribution Electives, choose one course each from four categories:		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

Computer Security Category

See courses under Computer Security concentration

Software and Application Category

CS 63005	ADVANCED DATABASE SYSTEMS DESIGN
CS 63901	SOFTWARE ENGINEERING METHODOLOGIES
CS 63902	SOFTWARE EVOLUTION
CS 64401	IMAGE PROCESSING
CS 67101	ADVANCED COMPUTER GRAPHICS
CS 67301	SCIENTIFIC VISUALIZATION

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

Concentrations or Thesis Option

Choose from the following: 12

- Computational Data Science Concentration
- Computer Engineering Concentration
- Computer Security Concentration
- Non-Thesis Option Concentration
- Thesis Option

Minimum Total Credit Hours: 32

Computational Data Science Concentration Requirements

Code	Title	Credit Hours
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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

Minimum Total Credit Hours: 12

Computer Engineering Concentration Requirements

Code	Title	Credit Hours
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Concentration Requirements

Concentration Electives, choose from the following: 12

CS 53301	SOFTWARE DEVELOPMENT FOR ROBOTICS
CS 53305	ADVANCED DIGITAL DESIGN
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
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Minimum Total Credit Hours: 12

Computer Security Concentration Requirements

Code	Title	Credit Hours
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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 57221	INTRODUCTION TO CRYPTOLOGY

Minimum Total Credit Hours: 15

Non-Thesis Option Concentration Requirements

Code	Title	Credit Hours
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Concentration Requirements

Computer Science (CS) Electives 12

Minimum Total Credit Hours: 12

Thesis Option Requirements

Code	Title	Credit Hours
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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.

Graduation Requirements

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