

Master of Science in Applied Computer Science

The Master of Science with major in Applied Computer Science for Experienced Professionals (MSACS) is a thirty-six hour graduate degree program with coursework in the following areas: Software Architecture, Embedded Systems, Software Engineering, Computing Systems, Robotics and A.I., Database Administration, Parallel & Distributed Systems, Distributed Object Technology. Through choice of electives, students may optionally choose to concentrate in one of two areas: Application Architecture, or Embedded Systems, or may choose from both areas. The MSACS is perfect for working professionals with industry experience in computing and information technology interested in obtaining a graduate degree in computer science, concurrent with work commitments. Courses are offered in a cohort/learning-community allowing students to complete the program in 22 months (5 semesters including a summer semester). The program is approachable for students with modest technical backgrounds,

and does not require an undergraduate degree in computer science. Graduates will be awarded certifications in Embedded Systems and a chosen professional certification.

Web-Based Instruction Delivery

Instruction is delivered both on campus and at a distance, using web-based technologies, allowing students to attend lectures on campus, or remote and live from work or home. All lectures are also recorded allowing students to view the archived lecture at their convenience. Real-time interaction between the students and professor will be supported using Voice-over-IP and online "chat".

Individual Lab Equipment

The non-traditional technology-based instruction delivery component of the MSACS program requires that students have off-campus access to laboratory components. Courses with hardware-specific lab experiments (embedded systems) will be conducted using hardware and equipment issued to each student for home and

off-campus use. In addition, the CSIS department maintains a faculty development and graduate student resource room with laboratory equipment available for student use. In addition, a MSACS graduate assistant resource room is available for graduate assistant use.

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The Fall admission is available for students with computing industry experience and degrees in fields other than Computer Science, while the Spring admission requires a degree in a Computer Science or a closely related discipline.

Fall Admission Requirements

1. An undergraduate degree from an accredited institution is required. Fall admission is open to various majors with appropriate backgrounds who can master the foundations, and is not restricted to undergraduate degrees in science and engineering, while the Spring admission requires a degree in a Computer Science or a closely related discipline.
2. Minimum cumulative undergraduate adjusted GPA of 2.75 on a 4.0 scale.
3. Experience in the computing industry is desired. This can include both part-time and full time experience.
4. Coursework in the following prerequisite foundations are required:
 - a. mathematics
 - b. physical science (basic electricity)
 - c. computer programming
 - d. computer architecture
 - e. data structures

Work experience and other coursework can selectively replace certain prerequisite knowledge foundations at the discretion of the program director with demonstration of student competency in the knowledge area.

5. Official GRE test scores. Although no specific minimum score is required, the applicant's GRE score will be considered in the competitive review process.

6. Other criteria will be considered by the MSACS Admissions Committee for applicants, including:
 - course work
 - major area coursework GPA
 - professional certifications in computing areas
 - relevant work experience
 - professional activities
7. International applicants must submit a minimum TOEFL score of at least 600 to be considered for admission.

Spring Admission Requirements

Spring admission requirements include all of the above requirements, plus one additional requirement:

1. An undergraduate degree in a computing field from an accredited institution is required.

In general, an undergraduate degree in computer science, computer engineering or a technical information systems program is sufficient for Spring Admission.

Grades in Graduate Courses

Expectations for satisfactory graduate level student performance are detailed in Academic Policies section of this catalog.

Petition to Graduate

Each MSACS candidate must complete a petition to graduate at least one semester prior to completion of program requirements. The petition will be reviewed by the MSACS director to ensure that all graduation requirements are being met, prior to submission to the KSU registrar's office.

Financial Information for MSACS Program

A. Premium Pricing

The MSACS Premium Program includes premium features that enrich the student's education with a variety of resources and experiences. The cost of the program is \$5000 per semester over five semesters for \$25,000 total. This tuition includes fees, books and class materials, access to lectures using distance learning technology, recorded lectures, a graduation banquet and hooding ceremony, and other premium features currently including: a laptop, PDA, digital logic lab kit including microprocessor and components, membership in the Association for Computing Machinery (ACM), and optional research project.

B. Financial Aid

All MSACS applicants are encouraged to apply for financial aid in the event of an emergency that could prevent them from fulfilling their commitment to the program.

C. Fee Schedule and Deadlines

Tuition is prorated over the length of the program, with a payment of \$5000 due on or before the first day of class for each of the five semesters. In addition, a \$250 deposit is due upon official notification of acceptance to the MSACS in order to reserve a place in the program. This deposit is a component of the first semester's tuition, leaving a remaining balance of \$4750 due on or before the first day of class for the first semester.

D. Payment of Fees

Methods of Payment

Payment of this fee and the \$5000 semester tuition fee can be made by check, credit card (VISA, MasterCard or Discover), or cash.

- Checks are sent to the Kennesaw State University, Bursar's Office, 1000 Chastain Road, MB #0503, Kennesaw, GA 30144-5591.
- Credit card payments are made by contacting the Bursar's Office at 770-499-3294.
- Cash payments must be made at the Cashier's Window in the Student Center.

If Tuition is Paid by Company (Third Party Payment)

In most instances, a company will not pay tuition until after grades are assigned. To set up this method of payment, the student must request the company to send a Letter of Authorization the Bursar's Office, Kennesaw State University, 1000 Chastain Road, Kennesaw, GA 30144-5591, at the beginning of the semester. The letter must include the following information:

- Student's name and social security number for whom tuition will be paid;
- Semester for which tuition will be paid;
- Amount of tuition that the company will pay;
- Copy of page(s) from Human Resource Manual stating the tuition payment or reimbursement policy of that company.

At the end of the semester, the student is responsible for requesting from the registrar a verification request letter confirming the semester and the grade received for the courses. Payment from the company is due no later than 15 days after the beginning of the following semester. The student is responsible for any amount not covered by the company. Unpaid balances should be paid at the beginning of the semester. If the student cannot cover the cost at the beginning of the semester, a Promissory Note must be signed by the student indicating a specific date before the end of the current semester when the balance will be paid in full.

Any questions regarding payment of tuition should be directed to the Program Coordinator in the Department of Computer Science and Information Systems, located in the Ann & John Clendenin Computer Science building, or telephone 770-423-6005.

E. KSU Tuition Stipend Policy

KSU Faculty and staff who participate in the MSACS program will receive a tuition reduction each semester. The individual will be responsible for the remaining balance of out-of-pocket expenses.

F. KSU MSACS Graduate Assistants

Graduate Assistants (different from Graduate Research Assistants) receive a \$2000 stipend per term for approximately 13 hours of work per week over a 15 week semester

G. KSU MSACS Graduate Research Assistant Tuition Remission

The MSACS has a limited number of Graduate RESEARCH Assistantships (GRA) available. GRAs receive a \$2000 stipend per term for approximately 13 hours of work per week over a 15 week semester. In addition, GRAs also receive a partial tuition waiver for each term they are employed as a GRA. GRAs work closely with graduate faculty on research projects.

H. Board of Regents Policy for Individuals 62 Years Old and Over to Attend Free Classes

The BOR policy for individuals 62 years old and older to attend free classes does not apply for premium professional programs. Instead, individuals in this age bracket will have tuition and fees waived according to the policy for tuition remission for KSU employees stated above. The individual will be responsible for the remaining balance of out-of-pocket expenses.

I. Refund Policy for Withdrawing from Classes

The following refund policy is in effect:

- A. Students withdrawing within the first two weeks during which classes are held each semester, will receive a 70% refund less expenses already incurred.
- B. Students withdrawing from classes after the first two weeks but prior to or on the "last day to withdraw from classes" of a semester of classes will receive a 40% refund less expenses already incurred.

- C. Students withdrawing from classes after the "official last day to withdraw from classes" will receive no refund.

MSACS students are responsible for notifying the Director when they plan to withdraw from the program. A withdrawal Form must be filled out, signed by the student and delivered to the Registrar's Office before a student is officially withdrawn from the class. A copy of this form and accompanying letter are sent to Student Accounts.

Foundation Courses

Students lacking formal preparation may be required to complete one or more of the following computing foundations courses. These courses are designed to provide an individually tailored program of study in computer science foundations, and will be delivered in an online self-study format. The prerequisites for these courses are program admission.

CS 8001 Computer Hardware 1 Hour

A study of basic computer hardware components and devices including floppy and hard disk drives, monitor technologies, printers, digital scanners and cameras, optical storage devices, backup devices, raid technology, Intel and AMD processor generations. The course will also discuss the differences (and similarities) between workstations, PCs, mainframes, servers, and supercomputers.

CS 8002 Computer Networking 1 Hour

A study of basic networking methods, topologies, devices and technologies.

CS 8003 Elementary Data Structures 1 Hour

A study of elementary data structures including arrays, lists, and trees, along with simple methods for sorting and searching.

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Credit Hours

CORE REQUIRED TRADITIONAL COURSEWORK 18

CS 8431	Software Engineering	3
CS 8532	Advanced Software Engineering	3
CS 8411	Embedded Systems and Micro-controllers	3
CS 8512	Advanced Embedded Systems and Micro-controllers	3
CS 8625	High-Performance Computing	3
CS 8630	Database Administration	3

COHORT ADMISSION SPECIFIC COURSES: 9

Fall Admission Requirements:

CS 8421	Computing Systems	3
CS 8422	Advanced Computing Systems	3
CS 8430	Object-Oriented Software Design	3

OR

Spring Admission Requirements:

CS 8990	Special Topics (taken two or more times)	3
CS 8635	Distributed Object Technology	3

ELECTIVES

Elective Coursework (3 hours required): Choose one of the following:

CS 8628	N-Tier Client-Server Systems	3
CS 8650	Introduction to A.I. and Robotics	3

Applied Studies Electives (6 hours required):

Students may elect to work on a professional certification program in UNIX or ORACLE, or students may choose to design an applied research project working closely with a faculty sponsor, or may choose to attend a professional conference and write a research paper. Students must complete six hours of study in applied computer science topics:

CS 8940 Directed Study: Professional Conference	3
CS 8940 Directed Study: Applied Research (3 or 6 hours)	3-6
CS 8940 Directed Study: Professional Certification	3

An applied research project requires a formal project proposal and plan, and must be approved by a faculty sponsor and by the program director.

PROGRAM TOTAL: 36

FULL-TIME STUDENTS

In addition, students who need to be full-time for visa or other requirements will take either 3 (Spring Admission) or 6 (Fall Admission) additional hours over their program, as arranged by the program director, at no additional cost. Full-time graduate load is 9 hours for Fall and Spring, and 6 hours for Summer semesters.

MSACS Course Descriptions**CS 8001. Computer Hardware. 1-0-1.**

Prerequisite: Admission to the MSACS program.

A study of basic computer hardware components and devices. Topics include storage, monitor technologies, printers, digital scanners and cameras, optical storage devices, backup devices, raid technology, processor generations, workstations, PCs, mainframes, servers, and supercomputers.

CS 8002. Computer Networking. 1-0-1.

Prerequisite: Admission to the MSACS program.

A study of basic networking methods, topologies, devices and technologies.

CS 8003. Elementary Data Structures. 1-0-1.

Prerequisite: Admission to the MSACS program.

A study of elementary data structures including arrays, lists, and trees, along with simple methods for sorting and searching.

CS 8411. Embedded Systems and Microcontrollers. 3-0-3.

Prerequisite: Admission to the MSACS program.

An introduction to embedded systems, embedded systems programming, microcontrollers and embedded system analysis and design. Discussion of real-time systems, operating systems, timing constraints and execution size limitations. Laboratory experience will realize theoretical concepts.

CS 8421. Computing Systems. 3-0-3.

Prerequisite: Admission to the MSACS program.

This course is the first in a sequence of two required core courses building a high level of competency in computing systems. The sequence builds content in the following knowledge areas: architecture performance enhancements, advanced computer architectures, data communications, networking protocols. Topics include caching, pipelines, super-scalar architectures, multiprocessors, multi-computers, networking, network protocols, and Internet protocols. Includes a review of basic computer architecture.

CS 8422. Advanced Computing Systems. 3-0-3.

Prerequisite: CS 8421.

This second course in the sequence continues the study of computing systems concentrating on networking and operating systems and covers distributed and networked systems. Topics include CPU time management, memory management, storage management, process control, synchronization and deadlock, distributed operating systems, data communications, networking protocols, distributed systems, distributed cache coherence.

CS 8430. Object-Oriented Software Analysis and Design. 3-0-3.

Prerequisite: Admission to the MSACS program.

This course covers topics in Object-Oriented Software analysis, design, and development along with an introduction to the study of algorithms and data structures. Topics include basic analysis and design concepts; problem solving and programming with Java; and data structures.

CS 8431. Software Engineering. 3-0-3.

Prerequisite: Admission to the MSACS program.

Techniques and formal methods in modern software design and engineering. Coverage of UML, design patterns and frameworks.

CS 8512. Advanced Embedded Systems and Microcontrollers. 3-0-3.

Prerequisite: CS 8411 and completion of CS 8001, 8002, 8003.

A continuation of Embedded Systems, with emphasis on interfacing, networking, and real-time systems analysis and design.

CS 8532. Advanced Software Engineering. 3-0-3.

Prerequisite: CS 8431 and completion of CS 8001, 8002, 8003.

A study of the use of simulation in the design and verification of complex software systems, specifically including real-time systems with hard timing constraints.

CS 8625. High Performance Computing. 3-0-3.

Prerequisite: CS 8628, CS 8422, CS 8512.

A study of high-performance computing systems and architectures, programming techniques, theoretical and practical parallel speedup alternative mechanisms and limitations. Include a brief introduction to Quantum Computing principles and projected application.

CS 8628. Software Architecture. 3-0-3.

Prerequisite: CS 8630.

A study of modern N-Tier Client Server systems that form the foundation for distributed computing systems. This course dovetails with the software-oriented orientation of CS 8635 Distributed Object Technology. Integrated topic spanning computer architecture, networking, middleware, operating systems, client-server system design.

CS 8630. Database Administration. 3-0-3.

Prerequisite: CS 8422.

An introductory course in database administration. Students will learn database theory, with hands-on applications.

CS 8635. Distributed Object Technology. 3-0-3.

Prerequisite: CS 8628 and CS 8532.

A presentation of Networks, UNIX and programming including inter-process communication, communication protocols, OSI mode, security, file transfer protocols, printer spoolers, remote command execution, remote login/access, performance and procedure calls.

CS 8650. Introduction to A.I. and Robotics. 3-0-3.

Prerequisite: CS 8512.

This survey course covers topics in Artificial Intelligence and Robotics. A survey of AI methods and approaches from search methods to neural networks will include hands-on with expert systems. A robotics kit will be included to allow students to analyze, design, build, and test simple robotic systems.

CS 8910. Professional Seminar. 1-0-1.

Students will complete three hours of CS 8910 Professional Seminar.

CS 8916. Coop. 3-0-3.

Prerequisite: Permission of Program Director.

Students may receive credit for coop and internship work through this course.

CS 8918. Internship. 3-0-3.

Prerequisite: Permission of Program Director.

Students may receive credit for coop and internship work through this course.

CS 8940. Directed Study. 1 to 3.

Requires permission of the Program Director and a faculty sponsor/mentor.

CS 8990. Special Topics. 1 to 3.

Prerequisite: Permission of Program Director.

Current topics in applied computer science, offered on an as needed basis.

