MASTER OF SCIENCE: COMPUTER SCIENCE

Student Learning Outcomes

Students graduating from this program will:

- Develop solutions for advanced problems using appropriate skills and knowledge in computer science.
- Demonstrate advanced knowledge in an area of specialization.
- Recognize and apply state of the art techniques and tools in the field.
- Plan and conduct scholarly activities.
- Work effectively in teams.

Program Description

The Master of Science in Computer Science (MSCS) is a 30 Credit Hours graduate degree program, which is accredited by the Higher Learning Commission (HLC). The MSCS Degree Program offers different options to help students complete the degree based on their needs and time and financial planning. The MSCS prepares the graduates for a wide range of future opportunities, whether it is corporate research, product development, manufacturing, service sector, the management, or entrepreneurial endeavors. It also prepares graduates for doctoral studies. The overall goal is to put graduates into a position to be leading technology developers and innovators.

Degree Options

- The MSCS Degree Program is open to both full-time and part-time students.
- The MSCS Degree Program admits both domestic and international students. *International students must comply with the US Federal Government's restrictions on the number of online classes*.
- The MSCS Degree Program offers two academic options: Thesis and Non-Thesis (Course) options. In the thesis option, the students have the opportunity to engage in research that builds upon the coursework to investigate the state-of-the-art and emerging challenges and topics in the chosen area.

MSCS Emphasis Areas

The MSCS Degree Program at UMKC has the following **4 Emphasis Areas:**

1. Software Engineering & Systems
2. Data Science
3. Networking & Telecommunications
4. Cybersecurity

Admission Requirements

Applicants for the MSCS should have a GPA of at least 3.0 on the scale of 4.0 in the last 60 semester hours of relevant undergraduate coursework in Computer Science, Software Engineering, and other related computing and engineering programs. Some students may have to take additional core computer science prerequisite courses if they do not have the necessary background for any specific graduate course or emphasis area. The following documents are required for consideration for admission:

1. Completed application form for graduate (masters) admission.
2. Official transcripts of all college work.
3. Graduate Record Examination (GRE) is **not required**.
4. For international applicants, a minimum test score of 79 (TOEFL iBT) or 6 (IELTS) is necessary (the older TOEFL and CBT scores are no longer accepted).
   a. **TOEFL/IELTS Waiver/Exemption**: International students from English speaking countries like the United Kingdom, Canada, Australia, and New Zealand do not need to take TOEFL or IELTS.
   b. International students from the following Non-English speaking countries: **India, Pakistan, Bangladesh, Egypt, Turkey, South Africa, and Singapore**, where the medium of college education in the STEM disciplines is English, **do not require TOEFL or IELTS**.
5. Two letters of recommendation are needed for applicants with an overall GPA of less than 3.0 in the last 60 hours of their undergraduate degree program.
6. Professional students with work experiences in relevant industries can petition for the waiver of some of the admission requirements.

MSCS Degree Requirements

1. MSCS students must complete at least 24 Credit Hours (equivalent to 8 regular courses) from CS topic areas (CS designated graduate courses). For some of the emphasis areas, the CSEE designated graduate courses will also be counted towards this 24 Credit Hours requirement. MSCS students can take the remaining 6 Credit Hours (equivalent to 2 regular courses) from any related discipline, including CS.
2. MSCS degree program has two options:
   a. Course-Option: 10 Courses (8 CS Courses + 2 courses from any related discipline).
   b. Thesis-Option: 8 Courses (6 CS Courses + 2 courses from any related discipline) + MS Thesis (6 Credit Hours).
3. Students of the MSCS Degree Program are typically required to take 5000-level graduate classes. However, students can petition to take up to six (6) Credit Hours of 400-level coursework for the MSCS degree.
4. Course Transfers: MSCS students can transfer a maximum of six (6) Credit Hours of graduate-level courses from any other accredited domestic and international institutes according to the rules and regulations set by the School of Graduate Studies (SGS) at UMKC.
5. For the minimum GPA and other requirements (for the domestic and international students) to complete the MSCS Degree, the rules and regulations set by the School of Graduate Studies (SGS) and the International Student Affairs Office (ISAO) will be followed. Students are advised to consult with the advisers and relevant faculty members periodically.

MSCS Degree Emphasis Area Selection Guidelines

1. The students in the MSCS Degree Program are not required to select an emphasis area. They will obtain the MSCS diploma if they fulfill the degree requirements listed above.
2. However, it is strongly recommended to **select at least one emphasis area** to be prepared for a career in that area.
   a. Employers in a particular sector would like to see that a graduate has a series of relevant courses and training in various topics and tools related to that sector.
   b. It is important to acknowledge that current technologies and industries are very specialized. Most of the time, employers ask for specific skills and academic backgrounds for each new position.
   c. Students are recommended to take at least 12 Credit Hours from a selected emphasis area. These 12 Credit Hours can be covered by four (4) courses or two (2) courses and the MS Thesis in the chosen field.
   d. To expand academic training and increase employability, **a student can take courses from two emphasis areas**. **Taking classes from more than two areas is highly discouraged**.
   e. If an MSCS student takes courses from 3 or more different emphasis areas, the employers may not find that student suitable for any of their positions after graduation.
3. A student can take a minimum of 12 Credit Hours (4 Courses) to a maximum of 30 Credit Hours (10 Courses) from one emphasis area (if courses are available). For example, suppose a student decides to emphasize in the "Data Science" area. In that case, the student can select all 10 courses from that area because there are more than ten (10) relevant graduate-level courses available at UMKC. Courses offered are subject to instructor availability and student interest. Additional courses may be available.

Core Requirements

All students are required to complete a core curriculum of:

Code	Title	Credits
Select three of the following:		9
COMP-SCI 5520	Network Architecture	
COMP-SCI 5531	Advanced Operating Systems	
COMP-SCI 5551	Advanced Software Engineering	
COMP-SCI 5565	Introduction to Statistical Learning	
COMP-SCI 5592	Design and Analysis of Algorithms	
Emphasis Area Coursework (see details below)		**21**
Total Credits		30

CS-Emphasis and CS-Areas of Interest

All students are required to complete courses in a CS-emphasis and/or area of interest. The approved areas and their associated courses are:

Cybersecurity Emphasis

Code	Title	Credits
COMP-SCI 5520	Network Architecture	3
COMP-SCI 5531	Advanced Operating Systems	3
COMP-SCI 5573	Information Security and Assurance	3

COMP-SCI 5590	Special Topics	1-6
COMP-SCI 5596A	Computer Security I: Cryptology	3
COMP-SCI 5596B	Computer Security II: Applications	3

Data Science Emphasis

Code	Title	Credits
COMP-SCI 5525	Cloud Computing	3
COMP-SCI 5530	Principles of Data Science	3
COMP-SCI 5540	Principles of Big Data Management	3
COMP-SCI 5542	Big Data Analytics and Applications	3
COMP-SCI 5560	Knowledge Discovery and Management	3
COMP-SCI 5565	Introduction to Statistical Learning	3
COMP-SCI 5567	Deep Learning	3
COMP-SCI 5576	Blockchain Technologies	3
COMP-SCI 5596A	Computer Security I: Cryptology	3
COMP-SCI 5596B	Computer Security II: Applications	3
COMP-SCI 5590	Special Topics	1-6

Networking and Telecommunications Emphasis

Code	Title	Credits
CSEE 5110	Network Architecture I	3
CSEE 5111	Network Architecture II	3
COMP-SCI 5525	Cloud Computing	3
COMP-SCI 5567	Deep Learning	3
COMP-SCI 5576	Blockchain Technologies	3
COMP-SCI 5578	Multimedia Communication	3
COMP-SCI 5590	Special Topics	1-6
COMP-SCI 5596A	Computer Security I: Cryptology	3
COMP-SCI 5596B	Computer Security II: Applications	3
E&C-ENGR 5570	Principles of Digital Communication Systems	3

Software Engineering and Systems Emphasis

Code	Title	Credits
COMP-SCI 5531	Advanced Operating Systems	3
COMP-SCI 5546	Distributed Computing Systems	3
COMP-SCI 5551	Advanced Software Engineering	3
COMP-SCI 5552A	Formal Software Specification	3
COMP-SCI 5559	Parallel Algorithms	3
COMP-SCI 5560	Knowledge Discovery and Management	3
COMP-SCI 5590	Special Topics	1-6