

# COMPUTER NETWORKING AND COMMUNICATION SYSTEMS

*The Interdisciplinary Ph.D. program is no longer accepting applications. The Civil Engineering, Computer Science, Economics, Education, Electrical and Computer Engineering, Humanities, Mechanical Engineering, and Natural Sciences Ph.D. programs are now open for applications. Please inquire to [umkcsgs@umkc.edu](mailto:umkcsgs@umkc.edu) with any questions.*

## Discipline Coordinator

**Baek-Young Choi, (816) 235-2750, [choiby@umkc.edu](mailto:choiby@umkc.edu)**

**Computer Networking and Communication Systems faculty who are members of the doctoral faculty.**

Computer Networking and Communication Systems is a discipline in the Interdisciplinary Ph.D. (<https://catalog.umkc.edu/colleges-schools/graduate-studies/interdisciplinary-phd-program/>) Program administered by the School of Graduate Studies.

**Note:** The discipline-specific requirements listed here are *in addition* to the requirements listed in Interdisciplinary Ph.D. Application Procedure and Minimum Criteria for Admission and Minimum Interdisciplinary Ph.D. Academic Regulations and Degree Requirements.

## Discipline-Specific Admission Requirements

A student who meets the minimum discipline requirements stated below will be considered for regular admission to the Ph.D. program. A student who does not meet some of the requirements but shows high potential for advanced-level work may be considered for provisional admission. Admission also depends on factors such as number of seats available, resources available in the area of student's interest, the quality of previous work, etc. A student not qualifying for admission to the Ph.D. program may be considered for admission to the M.S. computer science or electrical engineering program. Requirements for admission are similar whether the applicant is requesting Computer Networking and Communication Systems as the primary discipline or co-discipline.

### Academic Preparation

The applicant must have a bachelor's degree in computer science, computer engineering, electrical engineering, or related field requiring substantial training in at least one of the above fields and in mathematics with a GPA of 3.5 or better on a 4.0 scale, cumulative as well as in the major field. A master's degree is preferred for admission.

### Aptitude for Advanced Work

The student must demonstrate an aptitude for advanced-level work through national/international standardized examinations such as the GRE. The expected performance level is the 85th percentile in the quantitative portion of the GRE examination.

### Proficiency in English

The student must demonstrate his or her proficiency in oral and written communication in English through national/ international standardized English examinations such as TOEFL, verbal portion of the GRE, etc. The expected proficiency level is the 50th percentile in the verbal portion of the GRE or a TOEFL score of at least 550 on the paper-based test or 213 on the computer-based test. For tests taken after Sept. 26, 2005, the minimum required score is 80. UMKC students may also satisfy this requirement by obtaining an English Proficiency Certification from the English Department.

**Note:** As per University policy, all international students are tested for proficiency in English upon arrival on campus, irrespective of their scores in TOEFL or verbal portion of GRE, or any other test. A student's advisor may also require the student to take the above test, irrespective of the student's native language. As a result of this test, the student may be required to improve his or her oral and written communication in English before enrollment in the courses of the chosen disciplines.

### Recommendations

The student must provide at least *three* recommendation letters from the professors from his or her previous institution(s). If the applicant has been out of school for several years, recommendation letters from his or her supervisors (technical) will be acceptable. However, even in this situation, a recommendation letter from his or her last academic institution is highly recommended. A recommendation from a faculty member in the Computer Science Electrical Engineering (CSEE) Department at UMKC must be provided if the student has taken courses from or worked with the CSEE faculty.

### Statement of Goals and Objectives

The applicant must provide a 250- to 500-word essay on his or her goals and objectives of pursuing the Ph.D. in the chosen fields.

### Admission at an Advanced Level

An applicant who has already completed significant graduate coursework (15 or more semester hours of the post-master's work or 30 or more hours of the post-bachelor's work) toward a Ph.D. at another institution must provide reasons for changing institutions. The applicant must also provide a letter of endorsement from a doctoral faculty member in Computer Networking and Communication Systems indicating willingness to be the student's research advisor.

## Alternate Admission Criteria

The applicant may have received a bachelor's degree or a master's degree in computer science, computer engineering, electrical engineering or electronics or any other related field with substantial training in mathematics. An applicant not meeting the minimum admission requirements, or not having sufficient academic preparation (stated below under prerequisite knowledge) for advanced work in the chosen discipline(s), may be considered for provisional admission by the Computer Science and Electrical Engineering Department's Ph.D. committee if the committee sees high potential for advanced work from the rest of the applicant's credentials. Evidence of high potential might be pertinent work experience, published papers or extremely high achievement in related areas. In any case, the required GPA (or GPAs) must be at least 3.0. Applicants with an established research or publication record in a quantitative science are encouraged to apply to this discipline.

## Qualifying Requirements for Full Admission

### Prerequisite Knowledge

A Ph.D. student selecting Computer Networking and Communication Systems as the primary discipline is expected to have the level of preparation represented by the following courses before attempting advanced study. Every student must have coursework in mathematics at MATH 250 or above level, and at least four of the following course sequences (or their equivalent):

Code	Title	Credits
COMP-SCI 291	Discrete Structures II	3
COMP-SCI 303	Data Structures	3
COMP-SCI 404	Introduction to Algorithms and Complexity	3
E&C-ENGR 330	Electronic Circuits	3
E&C-ENGR 380	Signals and Systems	3
COMP-SCI 394R	Applied Probability	3
COMP-SCI 420	Advanced Networking and Applications	3
COMP-SCI 421A	Foundations of Data Networks	3
E&C-ENGR 477	Introduction to Wireless Networking	3
COMP-SCI 431	Introduction to Operating Systems	3
E&C-ENGR 474	Introduction to Communication Systems	3
E&C-ENGR 426	Microcomputer Architecture and Interfacing	3

A Ph.D. student selecting Computer Networking and Communication Systems as a co-discipline is required to have at least three of the CS/ECE courses listed above.

### Length of Time to Complete Qualifying Requirements

When a student is admitted provisionally, the CSEE Ph.D. committee will specify the conditions and length of time available to satisfy conditions to achieve regular-admission status.

## Suggested Compatible Co-disciplines

Computer Science (<https://catalog.umkc.edu/colleges-schools/graduate-studies/computer-science/>), Economics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/economics/>), Electrical and Computer Engineering (<https://catalog.umkc.edu/colleges-schools/graduate-studies/electrical-computer-engineering/>), Engineering (<https://catalog.umkc.edu/colleges-schools/graduate-studies/engineering/>), Geosciences (<https://catalog.umkc.edu/colleges-schools/graduate-studies/geosciences/>), Physics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/physics/>)

A co-discipline outside of this list may be considered only in exceptional cases.

## Core Program Requirements

The amount of work required for the Ph.D. depends on the student's level of preparation. For example, a student entering the Ph.D. program after earning a bachelor's degree may expect to do significantly more work compared to a student who enters after earning a master's degree.

## Qualifying and Comprehensive Examination Guidelines

The Qualifying Exam is a written test administered by the CSEE Department's Ph.D. committee. The test questions are from a set of fundamental courses spanning computer science, electrical and computer engineering, and telecommunication and computer networking. The Comprehensive Exam is administered by the doctoral committee of the candidate. A student can either take a written test or opt for an oral presentation covering both primary discipline and co-discipline areas. Discussion with and agreement from the student's doctoral committee is required before choosing the best option.

The candidates should contact the CSEE Division office and the chair of their doctoral committee for more information.

## **Computer Networking and Communication Systems as a Co-Discipline**

The number of hours required for a student who chooses Computer Networking and Communication Systems as a co-discipline will be at least 12 graduate credit hours. Up to three of these credit hours may be at the 400-level. Each student is required to take CSEE 5110 as part of the minimum 12 credit hours. Contact the Discipline Coordinator for the list of approved courses.

## **Financial Aid**

Various forms of financial aids (such as graduate research assistantships, graduate teaching assistantships, graduate fellowships) are available through the Computer Science and Electrical Engineering Department and the School of Graduate Studies. Contact the discipline coordinator for more information.