

COMPUTER SCIENCE

Discipline Coordinator

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Computer Science is a discipline in the Interdisciplinary Ph.D. (<http://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 who does not qualifying for admission to the Ph.D. program, may be considered for admission to the M.S. in computer science program. Requirements for admission are similar, whether the applicant is requesting computer science as the primary or co-discipline. Minimum Recommended Ph.D. Admission Requirements:

1. GPA (Bachelor or equivalent Degree): 3.5 in the scale of 4 (or equivalent)
2. GPA (MS or equivalent Degree if any): 3.5 in the scale of 4 (or equivalent)
3. GRE (Quantitative) minimum score: 80%
4. TOEFL iBTS minimum Score: 89 or IELTS minimum score: 6.5
5. Prior Projects or Publications (Preferred)*
6. Internationally Acceptable Accreditation of the Prior Degree Awarding Institutes

* Prior research project and/or publication record is not required for admission into CS Ph.D. program. However, doctoral faculty members give very high value to the students with such backgrounds.

Direct or Expedited PhD Program

It is not required to have an MS or equivalent degree to apply to CS Ph.D. program. We accept well qualified and motivated students with a Bachelor degree directly into our Ph.D. program. We actively encourage students in the Direct Ph.D. Program to try to complete the doctoral study within 4 or 5 years after the Bachelor degree. To complete the Ph.D. degree in an expedited timeline, first, the student has to be dedicated and well qualified. Second, the student must make a comprehensive plan at the beginning of the doctoral study to complete all the relevant steps within a strict timeline, which is challenging but not impossible.

Clarification of Minimum Requirements and Decision Process

Academic Preparation

The applicant must have a bachelor's degree and/or a master's degree in computer science, computer engineering, electronics, communications engineering or any other 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; and a GPA of 3.5 or better on a 4.0 scale, in all post-baccalaureate or post-master's degree work.

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 80th percentile in the quantitative portion of the GRE examination. The student must also show an excellent performance in all of his or her coursework.

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. Because 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.

Note: For students with a North American (USA and Canada) B.S. or M.S. degree the English Proficiency requirement is exempt.

Recommendation Letters

The student must provide at least **three** recommendation letters, identifying clearly his or her academic achievements and exceptional quality, 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. This is an important document for reviewing the application. Applicants, therefore, are advised to provide a clear account of their academic achievements and plans for higher study.

Admission at an Advanced Level

An applicant who has already completed significant graduate coursework (15 or more semester hours of post-master's work or 30 or more hours of 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 computer science doctoral faculty member indicating willingness to be the student's research advisor.

Ph.D. Admission Decision Process

Ph.D. admission decision is made by the CS Ph.D. Committee considering individual doctoral faculty member's needs and preferences. The role of CS Ph.D. Committee is to ensure that Ph.D. applicants satisfy the minimum requirements (GPA, GRE, TOEFL/IELTS, reputation of prior degree awarding institutes and other scholarly achievements). If the requirements are satisfied and a doctoral faculty member accepts the new applicant only then the CS Ph.D. Committee takes a positive decision about a particular applicant. In rare occasion, we bring exceptionally well-qualified students without the acceptance from a doctoral faculty.

Qualifying Requirements for Full Admission

Prerequisite Knowledge

A Ph.D. student selecting Computer Science (CS) as the primary (coordinating) Ph.D. discipline is expected to have the level of preparation represented by a four-year undergraduate degree in computer science. 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 with only a B.S. degree in computer science must have at least a GPA of 3.5/4.0 and an applicant with at least a year of graduate work must have at least a GPA of 3.5/4.0 before attempting advanced study.

Selection of a Co-Discipline and Suggested Compatible Co-Disciplines

To broaden the knowledge of the PhD students, the Interdisciplinary Ph.D. program requires each student to select a co-discipline closely related to the primary discipline. The following are suggested compatible co-disciplines for CS students:

Biomedical and Health Informatics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/biomedical-health-informatics/>), Cell Biology and Biophysics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/cell-biology-biophysics/>), Chemistry (<https://catalog.umkc.edu/colleges-schools/graduate-studies/chemistry/>), Computer Networking and Communication Systems (<https://catalog.umkc.edu/colleges-schools/graduate-studies/telecommunication-computer-networking/>), 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/>), Mathematics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/mathematics/>), Molecular Biology and Biochemistry (<https://catalog.umkc.edu/colleges-schools/graduate-studies/molecular-biology-biochemistry/>), Oral and Craniofacial Sciences (<https://catalog.umkc.edu/colleges-schools/graduate-studies/oral-craniofacial-sciences/>), Pharmaceutical Sciences (<https://catalog.umkc.edu/colleges-schools/graduate-studies/pharmaceutical-sciences/>), Pharmacology (<https://catalog.umkc.edu/colleges-schools/graduate-studies/pharmacology/>), Physics (<https://catalog.umkc.edu/colleges-schools/graduate-studies/physics/>)

A co-discipline outside of this list may be considered only in exceptional cases. These co-disciplines require 3 or 4 courses to be taken by the CS Ph.D. students to fulfill the co-discipline requirements.

Notes:

- CS Ph.D. students do not need to apply to a Co-Discipline at the time of admission.
- CS Ph.D. students have to select a co-discipline in the first semester after coming to UMKC.
- CS Ph.D. students are advised to consult their primary (CS) adviser to select an appropriate co-discipline.
- CS Ph.D. students can change their co-discipline any time before the comprehensive exam.

Transfer of Course Credit

New Ph.D. students with some prior graduate level course works from another university can apply to transfer up to 6 credit hours in each discipline (primary and co-discipline).

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 them to achieve full admission status.

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 primary discipline(s), may be considered for provisional admission by the CSEE Department Ph.D. committee if the committee sees high potential and preparation 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 on a 4.0 scale, and the coursework deficiencies for doctoral study in computer science must not be more than 18 semester hours. Applicants with an established research or publication record in a quantitative science are encouraged to apply.

Application for an MS Degree while Enrolled in CS Ph.D. Program

CS Ph.D. students may apply to receive an MS degree upon passing the qualifying and comprehensive exams provided that the coursework required for MS degree under course only option is completed. This is a very good option for students in CS Direct Ph.D. Program. However, this is subject to primary Ph.D. supervisor's approval.

Note: If a CS Ph.D. student fails to pass the Qualifying Exam in two attempts or cannot successfully complete the Comprehensive Exam, the student will not be allowed to apply for transfer to the MS program or apply to receive an MS degree even if the coursework required for MS degree under course-only option is completed. Please consult your CS Ph.D. supervisor and/or CS Ph.D. Discipline Coordinator for details.

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.

Computer Science as a Co-Discipline

- Students who choose CS as a co-discipline need to take 3 CS graduate courses (9 credit hours).
- Students who choose CS as a co-discipline do not need to take the CS Ph.D. Qualifying Exam.
- CNS and ECE Ph.D. students are automatically eligible for CS Co-Discipline.

Discipline Course Requirements

The total Interdisciplinary Ph.D. course credit (didactic) requirement is 30 hours which is divided into (a) primary discipline (12 credits), (b) co-discipline (9 credits), and (c) the remaining 9 credits can be completed either by doing graduate level courses at UMKC in any participating discipline or credits can be transferred from students' previous institutions. This credit transfer must be approved by the CSEE Department Ph.D. committee.

Full-time Status and Doctoral Residency Requirement

US Domestic students can enroll into any number of credit hours per semester during the regular academic year (Fall and Spring). International students are usually required to enroll in 9 credit hours per semester during the regular academic year (Fall and Spring) to maintain full-time (visa) status. However, for international graduate (PhD and MS) students with 50% FTE (20 hours per week) appointments as Graduate Research/Teaching Assistants the requirement is 6 credit hours of enrollment per semester for full time equivalence. Enrollment is not required in Summer. Interdisciplinary Ph.D. students must satisfy the doctoral residency requirement by satisfactory completion of at least 18 credits within 24 consecutive months.

Financial Aid

Various forms of financial aid (such as graduate research assistantships, graduate teaching assistantships, graduate fellowships) are available through the Computer Science Electrical Engineering Department and the School of Graduate Studies. Contact the discipline coordinator for more information. Most of our Ph.D. students are funded through Graduate Research Assistantship (GRA) and/or Graduate Teaching Assistantship (GTA). GRA support is provided by individual doctoral faculty members from their research grants. GTA support comes from Department Chair's instructional fund. However, the GTA support is also provided based on the recommendation of the Ph.D. advisor. The Department Chair normally honors the requests for GTA support if there are available GTA slots. Therefore, every Ph.D. student must have a faculty advisor to get funding in the form of GRA or GTA. Once a Ph.D. student is admitted the Department Chair and the doctoral faculty members will try our best to provide funding to the student throughout the Ph.D. study. However, the applicants must keep in mind that the number of funding slots (GRA and GTA) for the Ph.D. students are not unlimited. The supports are provided based on respective faculty adviser's recommendations and Department Chair's needs. The awarding of GRA and GTA funding is a competitive process. The students are required to maintain high academic standing and demonstrate strong research performance to get continuous support throughout the Ph.D. study. Our Department's policy is to provide support to as many Ph.D. students as possible. Additionally,

the UMKC School of Graduate Studies provides many different types of fellowships, awards and scholarships to qualified graduate students through a competitive selection process. Please visit the website of the School of Graduate Studies for further details.

Note:

- A GTA can only be awarded to a student after the student has successfully demonstrated his or her teaching potential to a committee and has successfully passed the English language test.
- If a student receives financial aid in the form of GTA/GRA from the CSEE Department or its doctoral faculty members after the full admission and enrolment into CS Ph.D. program, the student must complete the doctoral study. If a funded Ph.D. student decides to leave the program at any stage before the completion no terminal MS or equivalent degree will be awarded.

Monthly Stipend for Ph.D. Students with GRA/GTA Appointments

Ph.D. students with 50% FTE (20 hours per week) appointments as GRA/GTA will receive a stipend of around \$6000 (subject to availability of funds) per semester during the Fall and Spring semesters. This stipend will be paid in 4 or 5 monthly installments. All GRA/GTA appointments (if awarded) are for one regular academic year (Fall and Spring) for the new students. Beyond the first year, the GRA/GTA supports are subject to availability and performance. There is no guaranteed financial support for the Summer semester.

Tuition Rates and Credits

UMKC offers in-state tuition rates to all (domestic and international) Ph.D. students. Ph.D. students with 50% FTE (20 hours per week) GRA/GTA support from CSEE department will receive a tuition fee coverage of up to 6 credit hours per semester at in-state rate. Therefore, all Ph.D. students (domestic and international) with 50% FTE (20 hours per week) GRA/GTA appointment can maintain full-time status (6 credit hours per semester) with all tuition and fees covered by UMKC and CSEE Department. This tuition and fee coverage is in addition to the stipend mentioned above. However, there are some additional fees and expenses that have to be paid by the students at the time of registration, such as health insurance, books and supplies, and living costs.

Timeline and Steps Toward the Completion of CS Ph.D. Degree

New Ph.D. students are strongly advised to make a clear plan in consultation with the CS Ph.D. advisor as soon as they start their doctoral study to complete the following steps within the required time line:

1. Annual Evaluation: Every Ph.D. student is required to complete an annual evaluation. It is an online survey sent in two parts - one in the fall and one in the spring. The Annual Evaluation allows the student to discuss the previous year's achievements and the next year's goals, then the primary and co-discipline advisors provide feedback and guidance.
2. Ph.D. Qualifying Examination: Students taking an CS Ph.D. Discipline as the primary (coordinating) unit should make the first attempt to pass the qualifying exam during the first three (3) regular semesters after fully admitted to the doctoral study at UMKC. The student must pass both parts of the qualifying exam within four (4) regular semesters. Summer term is not counted.
3. Plan of Study: The Ph.D. Plan of Study form, signed by the student, members of the student's proposed Supervisory Committee, and the Academic Administrators in the student's disciplines, must be filed with the School of Graduate Studies no later than the end of the second year (24 months) after the student has been fully admitted. The Interdisciplinary Ph.D. Plan of Study may be filed prior to that time.
4. Formation of Ph.D. Supervisory Committee: The Supervisory Committee shall consist of at least five members composed of one doctoral faculty from each of the primary and co-disciplines, with a maximum of three from any one discipline. Regarding the formation of the committee the student should consult the primary (CS) Ph.D. supervisor, who will be the Chair of the Committee. Names and signatures of the committee members have to be submitted with the Plan of Study.
5. Fulfilling Ph.D. Residency Requirement: Ph.D. students must satisfy the doctoral residency requirement by satisfactory completion of at least 18 credits within 24 consecutive months.
6. Comprehensive Examination: The format and general requirements for the Comprehensive Exam vary according to the Ph.D. discipline. The Comprehensive Exam is administered by the candidate's supervisory committee. A student can either take a written test or opt for an oral presentation covering both primary and co-discipline areas. Discussion with and agreement from the student's doctoral committee is required before choosing the best option. Candidates should contact the CSEE Department's office and the chair of their supervisory committee for more information.
 - a. The CS Ph.D. discipline usually requires the students to make a formal presentation on the background study, current progresses and future plans regarding the selected research problems for doctoral study. CS students can take the Comprehensive Exam any time after passing the CS Ph.D. Qualifying Exam and the approval of the Plan of Study by the School of Graduate Studies.
7. Interdisciplinary Ph.D. Research Proposal: After the completion of the Comprehensive Exam, each Ph.D. student must submit a written Research Proposal to the School of Graduate Studies.
8. Doctoral Dissertation: The format and general requirements for the Doctoral Dissertation exam vary according to the discipline. The CS Ph.D. discipline requires the students to make a formal presentation on the outcomes of the doctoral research in front of the committee members. CS comprehensive exam and dissertation defense presentations are open to all students and faculty members. In addition, it is recommended that students submit a draft copy of the dissertation to the committee members prior to the presentation. The defense of the dissertation is approved when a majority of the supervisory committee members recommend approval and sign the Report of Results of Final Dissertation Examination form. Students can schedule the Dissertation Defense six months after the comprehensive exam.

- Final Dissertation Submission: During the semester of the Dissertation Defense, Ph.D. students must formally submit their Ph.D. dissertation according to the format and instructions of the School of Graduate Studies.

Notes:

- Ph.D. students are allowed to apply for extensions/exceptions/changes under exceptional circumstances.
- Part-time Ph.D. students may apply for flexibility of the timeline regarding the above-mentioned steps.
- Students are advised to regularly check the updates and modifications by the Schools of Graduate Studies.

Ph.D. Qualifying Exam for Computer Science Discipline

The qualifying exam is conducted to confirm that the student has a sound understanding of the fundamentals of computer science and has developed good problem-solving skills and research potential. This document includes the syllabus and describes the procedure for taking the qualifying exam in the Computer Science discipline.

Eligibility

The student must be fully admitted to the Ph.D. program at UMKC. Students admitted provisionally will have to satisfy all requirements stipulated in the letter of admission before being fully admitted.

Duration for Clearing Qualifying Exam

Both full-time and part-time students must take the Ph.D. qualifying exam by the third semester from the date of full admission. For example, if a student is fully admitted in the Fall 2015 semester, then he or she must take the qualifying exam by the Fall 2016 semester. Failure to do so will disqualify the student from continuing in the Ph.D. program. Upon consultation with his/her interim advisor, a student may choose to take the qualifying exam earlier than the third semester. If a student fails the qualifying exam in the first attempt then he or she **MUST** retake it in the subsequent semester. Failure to clear the exam in the second attempt disqualifies the student from remaining in the Ph.D. program with Computer Science as the primary discipline.

Qualifying Exam Application Dates

The Ph.D. qualification certification application will be received twice a year, the end of each semester.

Qualifying Exam Application Format

The CS Discipline Ph.D. qualification certification application will need to include (1) the following two components (Written and Oral) and (2) advisor's recommendation letter. It must be sent to the CS discipline Ph.D. coordinator (Dr. Lee, leeyu@umkc.edu).

Written component: Meet Either criterion 1 or 2

- Proof of a minimum GPA of 3.5 (A- or higher) on a 4.0 scale for CS5592 Design of Advanced Algorithm or equivalent qualification (e.g., transferred courses, passed equivalent Ph.D. Qualifying exam before transferring to UMKC)
- Proof of publications in top conference* or journals* including formal methods or algorithms

Oral component:

- Proof of a minimum GPA of 3.5 (A- or higher) from at least one Ph.D. level seminar course in CS department, UMKC (e.g., CSEE5690 Research Methods and Experimental Design, CSEE5690 Recent Advances in Deep Learning).

After reviewing the application, the committee will cast votes of "pass" or "fail" on both the oral and written components. Failure to do so will disqualify the student from continuing in the Ph.D. program. Upon consultation with his/her advisor, a student may choose to submit the qualification certification application earlier than the third semester. If a student fails the qualification certification application in the first attempt, he or she **MUST** resubmit it in the subsequent semester. Failure to clear the qualification certification in the second attempt disqualifies the student from remaining in the Ph.D. program with Computer Science as the primary discipline.