

Mathematical and Computational Sciences, PhD - Computer Science Emphasis

Admission Requirements

An applicant for admission to the Ph.D. in Mathematical and Computational Science - Computer Science emphasis should have completed a master's degree in Computer Science or a closely related area, with a GPA of at least 3.0/4.0. An applicant with an exceptional record may also be considered for admission into the Ph.D. program after completing a related bachelor's degree and/or some related graduate-level coursework. This type of application would require justification in the form of exceptional experience, GRE, prior education and/or research/publication involvement, which should be presented in the statement of purpose and reference letters.

A student admitted into the Ph.D. program can transfer prior graduate-level coursework, provided it was taken as a graduate student. Up to 27 credit hours can transfer to the Ph.D. for those with a master's degree, and up to 18 credit hours can transfer to the Ph.D. for other applicants, with the approval of the Graduate Program Director.

An applicant will be evaluated on the basis of competency (related academic or professional experience) in core areas of computer science including:

1. Programming skills and languages
2. Operating systems
3. Data structures and analysis of algorithms
4. Computer organization and architecture

Ph.D. applicants with some deficiencies in application qualifications can apply to the M.S. in Computer Science or M.S. in Cybersecurity - Computer Science Emphasis and apply to the Ph.D. program after completing appropriate courses, which will transfer into the Ph.D. program, subject to the caps described above.

Applicants are required to submit at least two reference letters and a statement of purpose.

International applicants are required to show proficiency in English by submitting results from exams such as TOEFL (minimum score 79) or IELTS (minimum score 6.5). The requirement is waived for students whose native language is English, or who have completed a previous degree from a US university. The requirement may also be waived for students who are permanent residents of the US and who have lived in the US for a substantial period.

Application Process

The department admits students for the Fall and Spring semesters on a rolling basis. For international students, the deadline is May 31 for the Fall semester and October 31 for the Spring semester.

Follow the directions on the Graduate School web site.

Degree Requirements

The requirements for the Ph.D. degree include the following:

1. Course work
2. Ph.D. candidacy
3. Doctoral dissertation

The requirements are described in detail below.

1. Course Work

- A minimum of 60 hours of courses numbered 4000 or above.
- At least 45 hours must be in courses numbered 5000 or above.
- At most 9 hours of ~~a student's enrollment in Dissertation Research~~ **dissertation research** may be counted as part of the Ph.D. Students are expected to maintain ~~a 3.0~~ **an average GPA of 3.0** on a 4.0 scale. All courses numbered below 5000 must be completed with at least a B grade. Courses outside the Department of Mathematics and Computer Science will require **prior** approval of the graduate **program** director.

~~When students who have earned a Master's degree are admitted to the doctoral program, appropriate credits of course work may be applied toward meeting the requirements for the doctoral degree, subject to Graduate School regulations and the approval of the graduate director. The same applied to those with some appropriate graduate credits but without a completed Master's degree.~~ Up to 27 credit hours of appropriate prior graduate courses can transfer to the Ph.D. for those with a master's degree, and up to 18 credit hours can transfer to the Ph.D. for other students, with the approval of the Graduate Program Director.

2. Ph.D. Candidacy

Advancement to Ph.D. candidacy is a three-step process consisting of:

1. Completing 18 hours of 5000-level courses, other than Ph.D. Dissertation Research, as appropriate for the selected option.
2. Passing the comprehensive examination.
3. Selecting a Ph.D. committee and preparing a dissertation proposal and ~~defense of~~ defending the proposal.

Qualifying Examination

A student must fulfill the following requirements.

Basic Requirement

Pass one written examination covering topics from the theory of programming languages, operating systems, analysis of algorithms, and computer systems. This examination would normally take place within the first 12 credit hours of study after admission to the Ph.D. program.

CMP SCI 4250	Programming Languages	3
CMP SCI 4760	Operating Systems	3
CMP SCI 5130	Advanced Data Structures and Algorithms	3
CMP SCI 5700	Computer Systems	3
Total Hours		12

Additional Requirement

After fulfilling the basic requirement above, the student must meet one of the following **criteria**:

1. Pass a written examination in an area of the student's interests. This area will be approved by the graduate committee and will be based on a set of two or more graduate courses taken by the student. This examination would normally take place within the first 24 credit hours of study after admission to the Ph.D. program.
2. Write a survey paper in a specialized area under the direction of a member of the graduate faculty. The student should propose to take this option when ~~he/she has already~~ **they have** finished at least ~~2~~ **two** graduate level courses and ~~has~~ **have** the approval of the graduate committee. The paper should be submitted within four semesters, at which time an oral examination given by a committee of at least three members of the graduate faculty **must be passed**.

~~In both parts~~ **For either option 1) and or 2)**, the graduate committee will determine if the topics are **consistent with appropriate** to the option that the student is pursuing.

Dissertation Committee and Dissertation Proposal

After completing the comprehensive examinations, each student chooses a dissertation advisor and prepares a ~~Dissertation Proposal~~ **dissertation proposal**. Usually students choose an advisor from contacts made through their course work. The dissertation committee will be formed, and the student will meet with this committee for an oral defense of ~~his/her~~ **the** dissertation proposal. The dissertation proposal is a substantial document describing the problem to be worked on and the methods to be used, as well as demonstrating the student's proficiency in written communication.

Doctoral Dissertation

Each Ph.D. candidate must write a dissertation that is an original contribution to the field on a topic approved by the candidate's Ph.D. Committee and the department, **and** which meets the standards and requirements set by the Graduate School, including ~~the~~ **a** public defense of the dissertation. Students working on a dissertation may enroll in Ph.D.

Dissertation Research, as appropriate for the selected option. A maximum of 9 hours Dissertation Research can be used toward the required credits ~~hours~~ of ~~work-in~~ courses numbered 5000 or above.

Rationale We were using these in the department for the CS option.