
Kansas State University

Doctor of Philosophy in Computer Science

1. INTRODUCTION

- 1.1 This document describes requirements and standards defined by the University and by the Department of Computing and Information Sciences for the degree of Doctor of Philosophy in Computer Science. All students are expected to meet these standards. If any exceptions to the requirements are warranted, the student's supervisory committee and the Graduate Studies Committee must approve and support those exceptions by signing a written statement that defines alternate requirements.
- 1.2 Other University requirements are described in the "Graduate Handbook" which is available on the Graduate School web page.

2. ADMISSION

- 2.1 A strong background in computer science is normally required for admission. Evidence of this background should include either a bachelor's degree in computer science or a Master's degree in computer science or a closely related field. Exceptional candidates with degrees in other areas will also be considered. If a student has a Master's degree, the grade point average in graduate courses taken toward this degree must be at least 3.5 out of 4.0 (excluding thesis, seminar, and implementation study courses). If students do not have a Master's degree, the grade point average in undergraduate courses must be at least 3.0.
- 2.2 Ph.D. applicants must have taken the Graduate Record Exam (GRE) with minimum scores of 400 Verbal, 700 Quantitative, 650 Analytical/4.5 Analytical Writing.
- 2.3 International students who received their degree(s) abroad must take the Test of English as a Foreign Language (TOEFL) and achieve a score of at least 575/233 (this requirement may be waived in certain cases, e.g., for applicants from Canada or Britain). To be eligible for financial support students must achieve a TOEFL score of at least 600/250, and a Test of Spoken English (TSE) score of 50 or better.
- 2.4 All qualifications taken as a whole must give evidence of a potential to conduct scholarly research. Besides the qualifications listed above, additional qualifications might include the strength of prior training, a strong score on the Computer Science GRE subject test, or published research.

3. GENERAL REQUIREMENTS

- 3.1 The Ph.D. degree requirements include 90 semester hours of graduate-level credit, typically distributed as 30 hours of Master's work, 24-30 hours of Ph.D. level coursework, and 30-36 hours for research culminating in a Ph.D. dissertation (See Section 4.3 below). At least 15 credit hours of Ph.D. work must be at the 800 or 900 level. Students must complete all work within seven years. International students may have attendance requirements to maintain their immigration status.
- 3.2 Students must maintain a grade point average of at least 3.0 in all coursework.
- 3.3 Students must make regular progress toward completion of the Ph.D. degree.
- 3.4 If a student is employed by the CIS Department, they must enroll for at least 9 hours of graduate-level credit each Fall and Spring term of employment. International students must meet the TSE requirements if they hold a GTA position. Some students new to Kansas State University may request to enroll in only 6 credit hours during their first semester.

3.5 Ph.D. students are expected to participate in the professional activities of the CIS Department. They should attend seminars and research group presentations offered by the department and by the professional societies within the department.

4. SPECIFIC REQUIREMENTS FOR THE PH.D. DEGREE

4.1 Upon admission to the Ph.D. program, the student will be assigned an academic advisor who will remain their advisor until the student selects a research advisor (see Section 4b).

4.2 By the end of the first year of Ph.D. studies, the student should mutually select and be accepted by a research advisor, or major professor. A student's research advisor must be a member of the Graduate Faculty in the CIS Department (see the "Kansas State University General Catalog" online for further information). Because the research advisor will organize and direct all research, students should choose an advisor carefully. Faculty members are not obligated to accept every student that asks them to be their research advisor. The faculty member may impose further requirements before agreeing to serve as the major professor. Students should not enroll in CIS 999, Ph.D. Research, until a Program of Study has been approved by the Graduate School.

4.3 In consultation with the research advisor, students must compose a Supervisory Committee. The research advisor is identified as the major professor of the Supervisory Committee. The Supervisory Committee must include three members of the Graduate Faculty in the Department of Computing and Information Sciences. Another member must be chosen from the Graduate Faculty outside of the CIS Department at Kansas State University. All committee members must be chosen so their field of interest is related to the dissertation research the student proposes to do. In addition to these four committee members, the Graduate School will appoint an Examination Chairperson (Outside Chair) from outside the CIS Department. The term Examination Committee will be used to refer to the Supervisory Committee together with the Examination Chairperson.

4.4 Students should consult regularly with their research advisor.

4.5 THE PROGRAM OF STUDY

4.5.1 The student must meet with the members of their Supervisory Committee and formulate a Program of Study which must be filed with the Graduate School within one year of starting the program. The Ph.D. Program of Study form is found on the Graduate School web page under Student Guidelines.

4.5.2 The Program of Study contains the following information :

4.5.2.1 Name of the major professor

4.5.2.2 Names of all members of the Supervisory Committee

4.5.2.3 Proposed title of dissertation

4.5.2.4 List of graduate credits taken and to be taken (totaling at least 90 hours)

4.5.3 The graduate credits must include the following:

4.5.3.1 Hours taken for the Master's degree. Students who bypass the Master's degree must take one course from each of the following five areas:

Implementation: CIS 690, 706, 736, or 722

Languages: CIS 705, 706, 771, or 806

Systems: CIS 720, 721, 725, 726, or 751

Structures: CIS 730, 740, or 761

Theory: CIS 770 or 775

Graduate Courses taken at other universities may be substituted for these courses subject to the approval of the Graduate Studies Committee.

4.5.3.2 Typically, 54 hours of course credit. Transfer credit may be counted toward this requirement in either or both of the following ways:

- 30 hours from a Master's degree may be transferred

-Up to 10 hours of other graduate credit may be transferred

All transfer credit is subject to the approval of the Graduate Studies Committee, the student's supervisory committee and the Graduate School.

- 4.5.3.3 At least 15 hours must be at 800 level or higher.
- 4.5.3.4 One or more courses in theoretical or fundamental topics that are approved by the Supervisory Committee as supporting the student's chosen direction of research.
- 4.5.3.5 At least 30 credit hours of Ph.D. research credits
- 4.5.3.6 Any additional requirements imposed by the student's Supervisory Committee. (An example: English 516, "Written Communication for the Sciences" is sometimes required for additional writing experience.)

4.6 The PhD BREADTH REQUIREMENT

- 4.6.1 The Breadth requirement requires demonstrating proficiency in six areas listed below by either passing an exam or taking a course:
 - 4.6.1.1 Operating Systems: Exam or CIS 520, CIS 720, or CIS 722.
 - 4.6.1.2 Database Systems: Exam or CIS 560 or CIS 761.
 - 4.6.1.3 Algorithm Analysis: Exam or CIS 575 or CIS 775.
 - 4.6.1.4 Formal Language Theory: Exam or CIS 770
 - 4.6.1.5 Programming Languages: Exam or CIS 505 or CIS 705
 - 4.6.1.6 Software Engineering: Exam or CIS 641 or CIS 740.
- 4.6.2 The student must receive an A in each 500-level course and a B⁺ or better in each 700-level course used to satisfy the Breadth requirement (B⁺/B/B⁻ grading will be done for the graduate courses listed above for the purposes of the Breadth exams). Courses taken at KSU as part of B.S. or M.S. or M.S.E. degree or approved courses from institutions with joint-PhD program with CIS Department at KSU can be used to satisfy the breadth requirement.
- 4.6.3 The Breadth requirement must be completed by the end of the third semester. If a student is planning to take one or more proficiency exams to satisfy the Breadth Requirement, it is highly suggested that they take those exams each semester starting with their first semester in the PhD program. Additional time may be granted at the time of admission if the student joined the program without a Master's degree. If the student fails to complete the Breadth requirement within the specified time, the student must leave the Ph.D. program.
- 4.6.4 The specific topics covered in the exams are defined in reading lists. The exams will be scheduled in November and April.

4.7 The PRELIMINARY EXAMINATION

- 4.7.1 Ph.D. students must pass a preliminary examination which will be the Research Proficiency Exam (RPE). The RPE is meant to judge the student's ability to conduct research, and is expected to lead the student into PhD research.
- 4.7.2 The RPE will be one-semester long, and during this semester, the student must make three public presentations and produce a written report. The gap between the presentations must be approximately four weeks and the last presentation must be before the finals week.
- 4.7.3 The RPE exam can be taken only after a student has finished the PhD Breadth Requirement.
- 4.7.4 Students must have their Program of Study filed with the Graduate School before requesting to schedule the first presentation (see Section 4.5). The student must request the ballot from the Graduate School before the final presentation. Upon passing the depth requirement, the student will be admitted to candidacy for the Ph.D. degree by the Graduate School.
- 4.7.5 For the RPE exam, the student must also fill out the RPE Form and form a RPE committee consisting of three faculty members from the CIS department. Members of the PhD supervisory committee (as listed in the Program of Study form) belonging to the CIS department must be included in the RPE committee. However, the Chair of the RPE committee must not be the Major Professor.

- 4.7.6 The student will start this process by choosing an area in consultation with the Major Professor. The first presentation should include a literature survey of the area and potential problems in the area. At the end of the first presentation, the supervisory committee will assign a specific problem to be explored. The second presentation should present the progress made towards addressing this problem. The third presentation must be accompanied with a 15-page written report containing literature survey, a description of the problem addressed, the technical approach used to solve the problem and the results. At the end of the first and second presentations, the student will be provided feedback on his/her progress and expectations for the next presentation. After the final presentation, the student's work will be judged as "Pass" or "Fail" by the RPE committee. Positive votes from a majority of the RPE committee will constitute a "Pass". The Chair of the RPE committee will record the committee decision on the preliminary ballot.
- 4.7.7 The RPE must be taken by the end of the fourth semester. If the RPE is graded as "Fail", then the student fails the Preliminary exam. As per Graduate School guidelines, the student will have one more chance to pass the Preliminary exam by taking the RPE exam again in the following semester. During the second attempt, the supervisory committee may choose to give the student a different problem to work on.

4.8 THE DISSERTATION RESEARCH

- 4.8.1 Once the student has passed all parts of the preliminary examination, they must write a research proposal about their dissertation research. The proposal must present background concepts and ideas from relevant literature, must define the topic and goal of the research, and must describe how the student will evaluate successful completion of the goal. Typically, successful completion of research can be demonstrated by formal proofs of results, by empirical measurement of results, by construction and demonstration of an operational model, or a combination of these methods. The student must formally present and defend the proposal in an open seminar, and afterwards, the Supervisory Committee must approve of the proposal. The proposal defense will be publicly announced by the Department, and the defense must be scheduled during the time classes are in session. The student must also post a paper copy of the proposal with the Graduate Studies Secretary so others may preview the work. Normally, the proposal defense must be completed within one year of completion of the preliminary examinations.
- 4.8.2 The student must work closely with their advisor on research and must write a dissertation.
- 4.8.3 The Ph.D. candidate must successfully defend their dissertation, subject to the following conditions:
- 4.8.3.1 The student must have been a candidate for the Ph.D. degree for at least seven months.
- 4.8.3.2 The student must obtain an Approval to Schedule Final Examination form from the Graduate School web page. Each member of the Examination Committee must have a final draft of the dissertation, and each member must confirm receipt and acceptance of that copy by signing the Approval to Schedule Final Examination form. When the Approval to Schedule Final Examination form with all the required signatures has been submitted to the Graduate School, they will send formal notification of the place and time of the final examination to all persons concerned. The dissertation defense must be scheduled during the time when classes are in session.
- 4.8.3.3 The student must allow the Examination Committee at least two weeks to read the dissertation prior to the final examination. (See Section 4.3d.iv). In the interest of open communication within the Department, when the dissertation is submitted to the student's committee, a copy of the final draft of the dissertation must be given to the Graduate Studies Secretary so other faculty members may preview the work.

- 4.8.3.4 The Ph.D. student must arrange with the Graduate Studies Secretary to reserve a room when they file the Approval to Schedule Final Examination form so the Department can make public announcement of the time, place, and title of the Ph.D. defense.
- 4.8.3.5 The student must schedule the oral presentation and defense of their dissertation (also called the final examination) with the Graduate School by turning in their Approval To Schedule Final Examination form. When the Approval form, abstract, and title page of the dissertation have been received in the Graduate School, the ballot will be sent to the Chairperson for the final examination.
- 4.8.3.6 The Ph.D. candidate must present the material described in their dissertation to their Examination Committee in an open seminar. After the public part of the presentation, the Examination Committee will dismiss other persons and present further questions to the student. The Committee will vote “pass” or “fail” on the dissertation and the presentation and defense of the material contained in it. If the Committee votes “fail” the student may make one additional presentation of the defense.
- 4.8.3.7 After the student has successfully completed the presentation and defense of their dissertation, they must make any modifications recommended by the Examination Committee in response to their presentation and defense. The student must submit the required number of signed copies of the final version of their dissertation, together with the fees and address information to the Graduate School.

5. UNRESOLVED ISSUES AND EXCEPTIONS

5.1 Any exceptions or issues not covered in this document will be resolved by the Graduate Studies Committee and by the Graduate Faculty of the Department of Computing and Information Sciences.