Handbook of the CCDM Ph.D. Program
Computer Science and Electrical Engineering Home Department

0. Overview

The CCDM Ph.D. program is an Area of Emphasis within the Computer Science Ph.D. program. Students are expected to meet the normal prerequisites for regular admission to the CS Ph.D. program, and to satisfy certain CCDM specific prerequisites as well. The CCDM Entrance Exam replaces the CS Ph.D. Qualifying Exam (see below for details). Upon passing the CCDM Entrance Exam a student becomes a regular CCDM Ph.D. student. Coursework requirements differ from those of the CS Ph.D. program, but are not in conflict with any existing CS Ph.D. requirements.

1. Admission

Only students who have gained regular admission status in the Computer Science Ph.D. program will be considered for admission to the CCDM program. Prerequisite courses must include:

CS 126 (Algorithms), Math 141 or Math 143 or Math 241 (Linear/Abstract Algebra), Stat 261 (Probability)

2. Coursework and Dissertation Requirements

(2.1) A student in the CCDM program must take all of these courses:

CS 326 (Advanced Analysis of Algorithms)	Math 301 (Combinatorics)
Math 303 (Graph Theory)	Stat 361 (Probability)

(2.2) At least 27 hours of approved graduate coursework credit in Mathematics, Statistics, and Computer Science (or approved electives) must be completed beyond the MS degree. Courses that do not count towards a graduate degree in one of these areas will not count towards these hours. At least 18 hours of doctoral-level courses must be taken. Students must choose major, principal minor, and secondary minor areas with the following distribution of graduate course credits:

Major area: at least 12 credit hours, among these at least 9 hours at the doctoral level.
Principal minor area: at least 9 credit hours, among these at least 6 hours at the doctoral level.
Secondary minor area: at least 6 credit hours, among these at least 3 hours at the doctoral level.

The major and principal minor area must be chosen from at least two of the groups A, B, C, of D listed below. In addition, either the major or principal minor area must be

Theoretical Computer Science.

A. Mathematics I: Analysis, Differential Equations, Numerical Analysis, Topology.
B. Mathematics II: Algebra, Combinatorics, Combinatorial Optimization and Matroid Theory, Graph Theory, Number Theory, Set Theory.
C. Statistics: Probability and Statistics, Multivariate Statistics, Linear Models, Data Mining, Statistical Computing, Markov Processes/Time Series, Bioinformatics, Probabilistic Networks.
D. Theoretical Computer Science: Design and Analysis of Algorithms, Approximation Algorithms, Randomized Algorithms, Graph Algorithms, Formal Languages and Automata, Complexity Theory, Theory of Database Systems, Mathematics of Computation, Recursion Theory, Information Dissemination.
E. Computer Systems: Operating Systems, Architecture, Distributed Systems
F. Programming Languages, Software, and Applications: Formal Specification of Languages, Design of Language Processors, Artificial Intelligence, Graphics and Multimedia, Image Processing, Data Communications, Distributed Database Management, Software Engineering, Computing Security.

(2.4) All courses fulfilling the degree requirements must be approved by the student's Ph.D. Advisory Committee in a formal plan of study. The courses listed in Section 2.1 may not be applied to the major and minor area requirements. Upon approval of the CCDM Supervisory Committee at most 6 credit hours may be taken as Independent/Directed study, however this is generally discouraged.

(2.5) The student must maintain at least a 3.0 GPA in all coursework attempted while enrolled in the CCDM Ph.D. degree program, and at least a 3.5 GPA in all Mathematics, Computer Science, and Statistics courses fulfilling the program requirements.

(2.6) The student must complete a Ph.D. dissertation and earn at least 24 hours of doctoral research credits.

3. Ph.D. Advisory Committee

The student must file a request with the CS Graduate Program Director to appoint a Ph.D. Advisory Committee. The Ph.D. Advisory Committee shall consist of five members with the dissertation adviser as chairman. At least one member of the committee must represent a department other than the student's home department and at least one member should be from outside the CCDM faculty. At least three committee members should be recognized CCDM faculty. The dissertation advisor and at least one other member will represent the major area. This committee will be appointed by the CS Graduate Program Director after consultation with the student, the proposed dissertation advisor, the department chairpersons, and the other faculty involved.

4. Examinations

(4.1) Each student must pass the CCDM Entrance Exam consisting of two parts:

1) The CCDM Breadth Exam (algorithms, combinatorics, probability, and graph theory).
2) One written exam from the following areas:
Algorithms, Combinatorial Optimization, Formal Languages and Automata, Complexity Theory, Abstract Algebra, and Mathematical Probability.
(A written CS Ph.D. Qualifying Exam in either Systems or Programming Languages may be substituted for part 2 of the CCDM Entrance Exam.)

Upon passing the CCDM Entrance Exam, a student becomes a regular CCDM Ph.D. student.

(4.2) A student may attempt the CCDM Entrance Exam at most twice. If a student passes one part of the exam, but fails the other, the student need only retake the failed part. But in any case, only two sittings for the exam overall are permitted. A student retaking an exam must do so at the first opportunity.

Subject to the approval of the CS Graduate Program Director, a student who fails the CCDM Entrance Exam on the first try may switch to the regular CS Ph.D. program, in which case the student may take the regular CS Ph.D. Qualifying Exam up to two times. Subject to the approval of the CCDM Supervisory Committee, a student who fails the regular CS Ph.D. Qualifying Exam on the first try may switch to the CCDM Ph.D. program, in which case the student may take the CCDM Entrance Exam up to two times.

(4.3) A CCDM Ph.D. student must pass the CCDM Qualifying Exam within two years of passing the CCDM Entrance Exam. The student may attempt this exam at most twice. The CCDM Qualifying Exam consists of two parts:

1) An exam administered by the student's Ph.D. Advisory Committee in the student's research area. This exam may be either written or oral, and will generally involve reading relevant research papers.
2) Presentation of a research prospectus. This document must outline the research project, provide a review of pertinent literature, and present methods to be employed in conducting the research.

Upon passing the CCDM Qualifying Exam, a student becomes a CCDM Ph.D. candidate.

(4.4) The grading and appeal procedures of these exams will follow the same procedures as defined in the Doctoral Program Handbook for Computer Science.

5. Dissertation Research Progress and Defense

A CCDM Ph.D. candidate will meet formally with the Ph.D. Advisory Committee at least once each academic year to give a research progress report. In any case, a candidate must have at least one progress meeting after the research prospectus is approved and before the dissertation defense.

Upon completion of the original research outlined in the prospectus, the doctoral candidate will present the dissertation to the Ph.D. Advisory Committee, after which the candidate will formally defend the dissertation at a public meeting. The dissertation must be presented at least two weeks prior to the dissertation defense date.

6. Switching Programs

(6.1) Upon the approval of the CS Graduate Program Director, a CCDM Ph.D. student who has passed the CCDM Entrance Exam may switch to the CS Ph.D. program, with the condition that the student must take a Ph.D. Qualifying Exam in an additional subject not taken by the student in the CCDM Entrance Exam. The student may take this exam up to two times.

(6.2) Upon the approval of the CCDM Supervisory Committee, a CS Ph.D. student who has passed the CS Ph.D. Qualifying Exam may switch to the CCDM Ph.D. program, with the condition that the student must take the CCDM Breadth Exam. The student may take this exam up to two times.

7. Other Requirements

(7.1) A student in the CCDM Ph.D. program must also fulfill other requirements which are not stated or revised above, and which are stated as CS Ph.D. program requirements in the Doctoral Program Handbook for Computer Science.

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