

Revision of the Current Examination Requirements for the Ph.D. in Mathematics**Current Requirements, as of Fall 2004.**

There exist two options for the written preliminary examinations currently.

Option I requires four written preliminary examinations, at least two of which must be in an area of pure mathematics, and no more than two can be in areas of applied mathematics. Upon receiving “A” grades in a two semester course sequence covering a prelim topic, the student may petition to waive that prelim.

Option II requires the student to take a broad array of courses with B grades or better: Real Analysis (331), Complex Analysis (235/236), Algebra (171), Probability (251), Numerical Analysis (362 or 368), Modeling (388 or 389), and a computing course. The student then must complete three written preliminary exams, at least one of which must be in an area of pure mathematics. No exams may be waived, but with adequate proof and grades, transfer credits may be substituted, as appropriate, for some of the required courses.

Research Tools

Ph.D. students must also pass two examinations: either two foreign language exams (German, French, or Russian), or one foreign language exam and one computing exam.

Oral Qualifying Examination

Following the completion of the preliminary examinations and research tools, the student prepares for and takes the Oral Qualifying Examination, which amounts to an exposition and presentation of the student’s proposed dissertation research. After passing this examination, the student becomes advanced to candidacy for the Ph.D.

This exam structure has many disadvantages, the greatest of which is its lack of flexibility for accommodating students who want to concentrate their studies in applied mathematics, having done previous degrees or graduate coursework in areas of engineering or science. Many of these students, while talented in applied mathematics, lack the formal training and indoctrination in pure mathematics needed to be successful under the current requirements. Another general disadvantage of the current policy is that there is no formal schedule or time limit set on when students take these exams, and this causes great inconvenience to the faculty who must write and grade such exams, often on short notice and in rapid succession.

Therefore, to better accommodate applied math students, and provide a more timely progression of study, we are implementing the following new exam structure.

New Requirements, Effective Fall of 2005**A. Qualifying Examination**

All math (pure or applied) Ph.D. students must take, at the end of their first year of study, a qualifying examination covering areas of advanced undergraduate mathematics that all prospective Ph.D. students in math should have mastered: undergraduate analysis, complex variables, probability, linear algebra, and differential equations. The exam would be given each spring (late May or early June). Part-time students would take the exam at the end of the academic year in which they first complete 16 units. The exam would have a duration of 6 hours, split into two 3 hour sessions, one in the morning (analysis and complex variables), and one in the afternoon (probability, linear algebra, differential equations).

Students would be given two chances to pass the examination, and upon failing it for the second time, would be dropped from the Ph.D. program, but allowed to complete a masters degree at the discretion of the examining faculty. Students failing the exam a first time **MUST** repeat the exam the next time it is given.

B. Preliminary Examinations

After passing the qualifying examination, Ph.D. students are required to pass two written preliminary examinations, each covering roughly two semesters of advanced graduate work in appropriate areas of graduate level pure or applied mathematics. Students can choose their examination areas (subject to approval by their graduate advisors) in pure or applied mathematics, depending on their research interests and relative orientation towards pure and applied mathematics¹. Students are given two chances at passing each exam, and must complete these exams before the completion of 48 units of coursework towards the degree. Failure to complete the exams within this period, without mitigating circumstances, will be cause for dismissal from the Ph.D. program.

C. Research Tools

Two research tools are required as described on pages 36-37 of the current CGU catalog. Thus, students will be allowed to be examined in scientific computing, specific computing languages, statistical research methods, computer database management, mathematical typesetting languages, or any of the foreign languages German, French, or Russian. Other foreign languages may be acceptable if the student can demonstrate (in a written petition) that there is substantial literature published in that language relevant to the student's dissertation research.

D. Dissertation Topic Oral Examination

After completing the qualifying and preliminary examinations, Ph.D. students must prepare and pass the Dissertation Topic Oral Qualifying Examination, which amounts to an exposition and presentation of the student's proposed dissertation research. After passing this examination, the student becomes advanced to candidacy for the Ph.D.

Students must take the Dissertation Topic Oral Qualifying Examination within 6 months of completing the required 72 units of course work towards the Ph.D.

Current students will be given the option of choosing the new examination requirements. However, once the new examination requirements are opted for, the student may not switch back to the old requirements.

¹ Ph.D. students who do not take both preliminary examinations in areas of pure mathematics will automatically be placed into the applied mathematics concentration option of the Ph.D.