

QUALIFYING EXAMS

There are two sets of exams (Basic and Advanced) which are intended to measure a student's overall mastery of standard material. The exams are administered in August and January, during the week just before each semester begins. In the preceding weeks, review sessions are often led by advanced graduate students.

Students may take a mix of Basic and Advanced exams in a given August or January session, but no more than three exams may be taken in one session. Note that for PhD students the deadline for passing the Basic exams is a full year earlier than the deadline for passing the Advanced exams (see the section "Time Limits" below), so it is highly recommended that the Basic exams be taken as soon as possible, even if this means delaying taking an Advanced exam which a student is prepared for.

Topics lists for the exams can be found later in these **Axioms**. Generally speaking, in the case of those exams based on basic graduate courses, the course covers most of the material on the topics list. However, due to time limitations and to differences of emphasis by instructors from year to year, not every topic can be covered in a given course. **It is the student's responsibility to master the material as listed in these Axioms.** Exam samples are available in the department's web site. A more complete file of recent exams is available to students in Room 1521E.

Basic Exams

The Basic Exams serve as both a Master's Exam and a first step in the Ph.D. qualifying process. The exams are given on separate days, and each lasts three hours. Ph.D. students must pass three Basic exams, while M.S. students must pass two — see the section "Degree Requirements" below. The emphasis is on very basic material typically covered in undergraduate and one-semester first-year graduate courses. Detailed descriptions of the Basic Exams required for each degree are given in the Degree Requirements section of the **Axioms**.

Each Basic Exam is composed and graded by a committee of several faculty. Their recommendations are given to the GAC which then makes final decisions about passing at the Ph.D. level, passing at the Master's level, or failure.

Advanced Exams

Except for the literature based oral exam in statistics (see below), the Advanced Exams are also 3 hour written exams given on separate days. Each part reflects the contents of a full-year course at the 600 or 700 level.

Mathematics students choose two parts from among Algebra (Math 611–612), Analysis (Math 623–624), Differential Equations (Math 645, Math 731), and Geometry (Math 703–704).

Statistics students take a written exam on advanced statistics and an oral exam on statistics literature. The written exam has two versions, one covering advanced probability theory and statistics, and asymptotic theory, and the other covering advanced probability theory and statistics, and linear models. The advanced statistics exam version I is based on advanced topics in Stat 607 and Stat 608, and topics from Stat 705. The advanced statistics exam version II is based on advanced topics in Stat 607 and Stat 608, and topics from Stat 725. The two versions are offered in alternate years depending on which of Stat 705 and Stat 725 is offered in a year.

For the literature-based oral exam, students need to choose a topic from the list of topics in the **Axioms** and form an exam committee of that topic that includes the primary faculty of topic and two secondary faculty. Students are then given references on the chosen topic to read. The exam is in the form of oral presentation and responding questions in front of the exam committee. A student may select a non-standard exam topic, in which case, the student must have the agreement of their committee members on the topic and the reading list.

In unusual cases, e.g. involving a student with a previous Master's degree, an exam at the Advanced level in a subject in which a student has extensive experience could be substituted for an Advanced Exam with the approval of the GAC.

The examining committee for each exam will report the outcome in detail to the GAC, which will then make the final decision about passing or failure. In some cases where a student does not pass, but in the opinion of the GAC, no purpose would be served by requiring the student to retake all or part of the exam, the GAC may offer alternative ways for the student to qualify for the Ph.D. These could include: an oral exam (which may cover additional material), additional coursework, etc.

Time Limits

The time limits for these exams are extremely important. Students should make sure they understand these time limits and plan their time in the department accordingly.

A student seeking only a Master's degree will normally attempt the Basic Exams at the beginning or middle of the second year.

A student who intends to pursue a Ph.D. **must have attempted three different Basic Exams no later than the beginning of the third semester here and must pass all three at the Ph.D. level no later than the start of the fourth semester here in order to continue.** Two Advanced Exams must be taken **no later than the start of the student's fifth semester and must be passed by the start of the sixth semester;** otherwise the student cannot become a Ph.D. candidate. (A student entering with a recent Master's degree, or equivalent coursework, will normally be expected to pass a complete set of three Basic and two Advanced Exams within 3 semesters.) There is no limit on the number of times the exams may be taken within the time frame described above, except for the literature-based oral exam for statistics students, which can only be taken twice. In order to take the oral exam, a student is responsible for forming an exam committee by the end of September for a January exam, or by the last day of spring classes for an August exam..

Starting with the class of 2010, all Ph. D. students in Mathematics must take the Advanced Calculus/Linear Algebra basic exam at the beginning of their first semester. Any student who fails the AC/LA exam needs to retake it every semester until they pass up to the beginning of the fourth semester (the current deadline for passing basic exams).