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## PhD Program

The PhD in Statistics is flexible and allows students to pursue a variety of directions, ranging from statistical methodology and interdisciplinary research to theoretical statistics and probability theory. Students typically start the PhD program by taking courses and gradually transition to research that will ultimately lead to their dissertation, the most important component of the PhD program.

### PhD Coursework

The core PhD curriculum is divided into five areas:

- Methods — STATS 600 and 601
- Practice — STATS 604
- Statistical Theory — STATS 511, 610, 611
- Probability — STATS 510, 620, 621
- Computing — STATS 507, 606, 608

All doctoral students must complete the following in their first three semesters in the program and before advancing to candidacy:

1. Take all methods and practice courses (600, 601, 604)
2. Take at least two courses in the combined areas of statistical theory and probability, including at least one course in statistical theory and at least one 600-level course
3. Take at least one computing course
4. Achieve a 3.5 average grade (on the 4.0 scale used by Rackham) in 600, 601, 604, and one 600-level statistical theory or probability course

Not completing requirements 1-4 by the end of the third semester will trigger probation which, if not resolved by the end of the fourth semester, may lead to dismissal from the program.

By the end of the PhD program, all students must take at least 30 credits of graduate statistics courses. All courses from the core areas count towards this total, as well as all 600-level, 700-level, and selected additional 500-level courses with approval of the PhD Program Director. Seminars and independent study courses do not count. At least 21 credits must be at the 600-level or higher. The Rackham Graduate School requires PhD students to maintain an overall GPA of at least 3.0 to remain in good standing.

In addition, all doctoral students must take 4 credits of cognate courses as required by the Rackham Graduate School, and two professional development seminar courses. Cognate courses are 400- and higher-level courses from outside Statistics and not cross-listed with Statistics. All cognate course selections must be approved by the PhD Program Director. The professional development courses are

- STATS 810, research ethics and introduction to research tools, in the first semester in the program.
- STATS 811, technical writing in statistics. Students are strongly advised to complete this course in their second or third year.

### Typical Course Schedules

Our PhD program admits students with diverse academic backgrounds. All PhD students take STATS 600/601 in their first year. Students are strongly encouraged to take STATS 604 in their second year (STATS 600 is a prerequisite). Students with less mathematical preparation typically take Stats 510/511 (the Master's level probability and statistical theory) in their first year and 600-level probability and/or statistical theory courses in their second year. Advanced students, for example those with a Master's degree, typically do not need to take 510/511, and in some cases may skip 610 and 621. Students who wish to take 600-level probability and statistical theory courses in their first year must take a placement test just before the fall semester of their first year to get approved. The PhD Program Director will help each student choose their individual path towards completing the requirements.

#### Sample Schedule 1:

	Fall Semester	Winter Semester
Year 1	510, 600, 507, 810	511, 601, 606 or 608 or 620 or cognate
Year 2	604, 610 and/or 621 and/or cognate	620 or 611 or elective, 606 or 608 or cognate

#### Sample Schedule 2:

	Fall Semester	Winter Semester
Year 1	600, 610 and/or 612, 810, 507	601, 611 and/or 620, 606 or 608 or cognate
Year 2	604, elective, cognate	606 or 608, elective, cognate

### Advancing to Candidacy

Students are expected to find a faculty advisor and start research leading to their dissertation proposal no later than the summer after their first year. The PhD Program Director and the faculty mentor assigned to each first year student can assist with finding a faculty advisor. Students are expected to submit a dissertation proposal and advance to candidacy some time during their second or third year in the program.

Requirements for advancing to candidacy are:

- Satisfying Requirements 1-4
- Completing at least 4 credit hours of cognate courses
- Writing a dissertation proposal and passing the oral preliminary exam, which consists of presenting the proposal to the student's preliminary thesis committee

A dissertation proposal should identify an interesting research problem, provide motivation for studying it, review the relevant literature, propose an approach for solving the problem, and present at least some preliminary results. The written proposal must be submitted to the preliminary thesis committee and the graduate coordinator ahead of time (one week minimum, two weeks recommended) and then presented in the oral preliminary exam. The preliminary thesis committee is chaired by the faculty advisor and must include at least two more faculty members, at least one of them from Statistics. The faculty on the preliminary thesis committee typically continue to serve on the doctoral thesis committee, but changes are allowed. Please see Rackham rules on thesis committees for more information.

At the oral preliminary exam, the committee will ask questions about the proposal and the relevant background and either elect to accept the proposal as both substantial and feasible, ask for specific revisions, or decline the proposal. The unanimous approval of the proposal by the committee is necessary for the student to advance to candidacy.

### Additional Information

Students are encouraged to complete the bulk of their coursework beyond Requirements 1-4 in the first two years of study. Candidates are allowed to take only one course per semester without an increase in tuition.

All PhD students are expected to register for STATS 808/809 (Department Seminar) every semester unless restricted by candidacy, and attend the seminar regularly regardless of whether they are registered.

Exceptions to the PhD program requirements may be granted by the PhD Program Director.

### Annual Progress Reports

Each candidate is required to meet with the members of their thesis committee annually. This could be in the form of either giving a short presentation on their research progress to the thesis committee as a group, or meeting with committee members individually. Following the meeting(s), each committee member completes a Thesis Committee Member Report and returns it to the student. The student should share the completed Thesis Committee Member Reports with both the PhD Program Coordinator and their advisor. At the end of the academic year, a written progress report and plan for next year must be developed and signed by both the student and the advisor.

### Dissertation and Defense

Each doctoral student is expected to write a dissertation that makes a substantial and original contribution to statistics or a closely related field. This is the most important element of the doctoral program. After advancing to candidacy, students are expected to focus on their thesis research under the supervision of the thesis advisor and the doctoral committee. The doctoral committee must include at least three regular faculty members from Statistics and at least one regular faculty member from another department (a cognate member). The written dissertation is submitted to the committee for evaluation and presented in an oral defense open to the public.

## Rackham Requirements

The [Rackham Graduate School](#) imposes some additional requirements concerning residency, fees, and time limits. Students are expected to know and comply with these requirements.

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