MATHMATICS, PH.D.

The department offers the doctor of philosophy degree with a major in mathematics and a master of arts degree in mathematics.

The Ph.D. degree requires proficiency in basic and advanced graduate mathematics and the completion of a dissertation containing a significant piece of original research in some area of mathematics. The scope of the research program in mathematics is broad. The Ph.D. specialty and dissertation may be in any area of mathematics, including but not limited to algebra, algebraic geometry, applied mathematics, combinatorics, computational mathematics, complex analysis, differential equations, differential geometry, dynamical systems, harmonic analysis, logic, mathematical biology, number theory, probability, and topology. A complete list of faculty and their areas of expertise is available through the department website (https://www.math.wisc.edu/graduate).

Students in the Ph.D. program also have the option to earn a master of arts degree (http://guide.wisc.edu/graduate/mathematics/mathematics-ma).

ADMISSIONS

Admission is competitive. Applicants to the Ph.D. program are automatically considered for financial support. For more information about application to the Ph.D and M.A. programs, see the department’s admission website (https://www.math.wisc.edu/graduate/admissions).

GRADUATE SCHOOL ADMISSIONS

Graduate admissions is a two-step process between academic degree programs and the Graduate School. Applicants must meet requirements of both the program(s) and the Graduate School. Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/admissions).

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further information (https://grad.wisc.edu/funding) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

PROGRAM RESOURCES

Prospective students should see the program website for funding information (https://www.math.wisc.edu/graduate/financialsupport).

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/requirements).

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Mode of Instruction</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</tbody>
</table>

Mode of Instruction Definitions

Evening/Weekend: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

Online: These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.

Hybrid: These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

Accelerated: These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

CURRICULAR REQUIREMENTS

<table>
<thead>
<tr>
<th>Minimum Credit Requirement</th>
<th>54 credits</th>
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<tbody>
<tr>
<td>Minimum Residence Credit Requirement</td>
<td>32 credits</td>
</tr>
<tr>
<td>Minimum Graduate Coursework Requirement</td>
<td>For students in the Ph.D. program the coursework in the mathematics department is expected to consist only of graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (<a href="http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle">http://my.wisc.edu/CourseGuideRedirect/BrowseByTitle</a>).</td>
</tr>
<tr>
<td>Overall Graduate GPA Requirement</td>
<td>3.00 GPA required</td>
</tr>
<tr>
<td>Other Grade Requirements</td>
<td>No additional grade requirements</td>
</tr>
<tr>
<td>Assessments and Examinations</td>
<td>All students are required to pass at least one qualifying exam by the beginning of their fourth semester (the spring semester of the second year), and two by the beginning of their sixth semester (the spring semester of the third year.) Students must satisfy all the requirements for dissertation status by the end of the eighth semester (end of fourth year).</td>
</tr>
</tbody>
</table>
Mathematics, Ph.D.

Language Requirements
No language requirements.

Doctoral Minor/Breadth Requirements
All doctoral students are required to complete a 12-credit minor.

REQUIRED COURSES
Take a total of 54 graduate credits, or generally 18 courses. This includes courses in math and in a minor. In the Ph.D. program, math courses numbered above 700 are for graduate credit. Math courses below 700 must be approved by the academic advisor.

There are five general and overlapping areas of specialization within the department:

- Algebra, Algebraic Geometry, Combinatorics and Number theory
- Analysis, Differential Equations and Probability
- Applied and Computational Mathematics
- Logic
- Geometry and Topology

There is also a specialty in Mathematics Education. The course requirement is the same as for the other specialties except that the required 54 credits should include 18 credits in courses that relate to mathematics education, and at least one of the courses must be on research techniques in education. The 18 credits may come (wholly or in part) from courses included in the minor.

These tracks are internal to the program and represent different pathways a student can follow to earn this degree. Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

POLICIES

GRADUATE SCHOOL POLICIES
The Graduate School's Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

MAJOR-SPECIFIC POLICIES

GRADUATE PROGRAM HANDBOOK
The Graduate Program Handbook (https://www.math.wisc.edu/graduate_gsh_toc) is the repository for all of the program's policies and requirements.

PRIOR COURSEWORK

Graduate Work from Other Institutions
With program approval, students in the Ph.D. program are allowed to count no more than 22 credits of graduate coursework from other institutions. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW-Madison Undergraduate
No more than 7 credits from a UW-Madison undergraduate degree are allowed to count toward the degree. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW-Madison University Special
With program approval, students are allowed to count no more than 15 credits of coursework numbered 300 or above taken as a UW-Madison Special student. Coursework earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

PROBATION
The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

1. Good standing (progressing according to standards; any funding guarantee remains in place).
2. Probation (not progressing according to standards but permitted to enroll; loss of funding guarantee; specific plan with dates and deadlines in place in regard to removal of probationary status).
3. Unsatisfactory progress (not progressing according to standards; not permitted to enroll, dismissal, leave of absence or change of advisor or program).

ADVISOR / COMMITTEE
Students who are not yet working with a dissertation advisor are required to meet semiannually with their academic advisor. All students must have a dissertation advisor by the end of the sixth semester.

CREDITS PER TERM ALLOWED
15 credits. Minimum of 6/semester, other than dissertators.

TIME CONSTRAINTS
Eight years. Extensions have to be approved by the program.

A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five years after passing the preliminary examination may by require to take another preliminary examination and to be admitted to candidacy a second time.

Doctoral degree students who have been absent for ten or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

OTHER
n/a
PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES
Take advantage of the Graduate School’s professional development resources (https://grad.wisc.edu/pd) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES

1. Learn a substantial body of mathematics in introductory and research level graduate courses in mathematics.

2. Complete a dissertation under the guidance of an advisor. The dissertation should make an original and substantive contribution to its subject matter.

3. Demonstrate breadth within the learning experiences.

4. Present research in seminar talks, conferences or publications.

5. Communicate complex ideas in a clear and understandable manner.

6. Foster ethical and professional conduct.

PEOPLE

Faculty: Professors Anderson, Angenent, Arinkin, Assadi, Bolotin, Boston, Căldăraru, Craciun, Denissov, Ellenberg, Feldman, Gong, Jin, Lempp, Mari Beffa (chair), Maxim, Miller, Mitchell, Paul, Roch, Seeger, Seppäläinen, Smith, Terwilliger, Thiffeault, Valko, Waleffe, M. Wood, Yang; Associate Professors Dymarz, Gurevich, Kent, Stechmann, Street, Yin; Assistant Professors Andrews, Erman, Ifrim, Kim, Li, Marshall, Sam, Soskova, Spagnolie, Stovall, Tran, Bi. Wang, Bo. Wang, L. Wang, P. Wood; Affiliate Faculty Bach, Cai, Del Pia, Ferris, Ron, Sifakis.