Mathematics

Department Information

- **Department Chair:** Friedrich Littmann, Ph.D.
- **Graduate Coordinator:** Indranil Sengupta, Ph.D.
- **Department Location:** 408 Minard Hall
- **Department Phone:** (701) 231-8171
- **Department Web Site:** www.ndsu.edu/math (http://www.ndsu.edu/math/)
- **Application Deadline:** March 1 to be considered for assistantships for fall. Openings may be very limited for spring.
- **Credential Offered:** Ph.D., M.S.

At least one year of academic work must be spent in residence at NDSU in fulfilling graduate requirements for each graduate degree earned. The M.S. customarily takes two years to complete: the Ph.D. usually last three years beyond the master's. Students must maintain a cumulative GPA of at least 3.0 throughout their graduate career.

**Master of Science**

The Master of Science degree is offered in two options: the Plan A Thesis Option or the Plan B Comprehensive Study Option. The Thesis Option emphasizes research and preparation of a scholarly thesis, whereas the Comprehensive Study Option emphasizes a broader understanding of a major area of mathematics.

**Departmental Requirements**

At least 30 credit hours in approved graduate-level mathematics course work, depending on the degree option.

1. **Thesis Option:** At least 6 credit hours of MATH 798 Master's Thesis, in addition to at least 18 credit hours in courses numbered 700-789. These 18 credit hours must include six foundational courses. A grade of Master's Pass in two of the written preliminary examinations offered by the department. A thesis paper written under the supervision of a faculty member and defended at an oral examination administered by the student's supervisory committee.

2. **Comprehensive Study Option:** At least 2 credit hours of MATH 797 Master's Paper in addition to at least 24 credit hours in courses numbered 700-789. These 24 credit hours must include six foundational courses. Subject to the approval of the supervisory committee, at most 6 of the required 30 credits may be earned in 600-level mathematics courses (excluding 620, 621, 650, and 651) or in courses outside the Mathematics department. A grade of Master's Pass in two of the written preliminary examinations offered by the department. An expository paper written under the supervision of a faculty member and defended at an oral examination administered by the student's supervisory committee.

3. **Exam Only Option:** At least 30 credit hours in approved graduate-level mathematics course work. At least 21 credit hours in courses numbered 700-789, 800-889. These 21 credit hours must include six foundational courses. Subject to the approval of the supervisory committee, at most 6 of the required 30 credits may be earned in 600-level mathematics courses (excluding 620, 621, 650, and 651) or in courses outside the Mathematics Department. A grade of Ph.D. Pass in four of the written preliminary examinations offered by the department, and a passing grade in a preliminary oral examination administered by the student's supervisory committee after completion of the written preliminary examinations.

**Timelines**

Per departmental policy candidate has three calendar years from the time of enrollment in the Graduate College to complete the Master's degree. Extensions may be granted after review and approval by the graduate committee.

**Doctor of Philosophy**

The Doctor of Philosophy degree is awarded in recognition of high scholarly attainment as evidenced by a period of successful advanced study, the satisfactory completion of prescribed examinations, and the development of an acceptable dissertation covering a significant, original aspect of mathematics.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
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<td>Foundational Courses</td>
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Algebra
MATH 720 Algebra I 3
MATH 721 Algebra II 3
MATH 726 Homological Algebra 3
Analysis
MATH 750 Analysis 3
MATH 754 Functional Analysis 3
MATH 756 Harmonic Analysis 3
Applied Mathematics
MATH 760 Ordinary Differential Equations I 3
MATH 784 Partial Differential Equations I 3
Combinatorics
MATH 736 Enumerative Combinatorics 3
MATH 737 Algebraic Combinatorics 3
Geometry/Topology
MATH 746 Topology I 3
MATH 747 Topology II 3
Graduate Seminar
MATH 790 Graduate Seminar 3
Doctoral Research
MATH 899 Doctoral Dissertation 6

- Subject to the approval of the supervisory committee, at most 12 of the required 42 credit hours may be earned in 600-level mathematics courses (excluding 620, 621, 650, and 651) or in courses outside the Mathematics Department. Credits used to satisfy the requirements of a master’s degree at NDSU may be included in the 90 credits hours required for the doctoral degree.
- Ph.D. A student entering the doctoral program with a master’s degree from another institution need only complete 60 credit hours to complete the Ph.D. degree. Half of these 60 credits must be in courses numbered 700-789 excluding those courses numbered 720, 721, 750, and 751.
- A grade of Ph.D. Pass in four written preliminary examinations offered by the department.
- A passing grade in a preliminary oral examination administered by the student's supervisory committee after completion of the Preliminary Examinations.
- A dissertation consisting of a written presentation of original and significant research completed by the student under the supervision of a faculty member and defended at an oral examination administered by the candidate’s supervisory committee.

Timelines
Ph.D. students have through the January Preliminary Exams during their third year in the program to demonstrate proficiency in basic areas of mathematics by passing the written Preliminary Examinations. In the Spring semester of the third year the department committee will meet to discuss any candidates who have not completed their written preliminary examinations and make one of three recommendations:

1. If the students have earned a master’s pass on two exams, then they will be granted an additional year in the program to complete a Master’s degree. Whether they are able to complete the Master’s degree or not they will be removed from the program after the additional year.
2. If the committee determines that the student is not making adequate progress, the student's funding (if any) will terminate at the end of the academic year, and they will have one year to complete a Master’s degree. Whether they are able to complete the Master's degree or not they will be removed from the program after the additional year.
3. If the committee determines that an extension of the timeline is appropriate, then written notice will be given outlining what the student must accomplish by a specified date to continue receiving funding and/or remain in the program.