PhD in Mathematics

Degree Requirements

This is a professional research degree designed to prepare students for various advanced professional careers, including college teaching and research. Before formally becoming a candidate, a student must have training equivalent to that required for a master's degree.

Core Courses

MATH 8410	Algebra I	3
MATH 8411	Algebra II	3
MATH 8420	Theory of Functions of Real Variables I	3
MATH 8421	Theory of Functions of Real Variables II	3
MATH 8425	Complex Analysis I	3
MATH 8430	Differentiable Manifolds	3
MATH 8630	Harmonic Analysis I	3
MATH 8445	Partial Differential Equations I	3
MATH 8440	Advanced Ordinary Differential Equations I	3
MATH 8521	Algebraic Number Theory	3
MATH 8628	Functional Analysis I	3
MATH 8510	Commutative Algebra I	3
MATH 8631	Harmonic Analysis II	3
MATH 8302	Topics in Harmonic Analysis (section 1 - Theory of Distributions)	3
MATH 8480	Advanced Probability	3
MATH 8650	Differentiable Manifolds and Riemannian Geometry	3
MATH 8402	Topics in Mathematical Physics (section 1 - Mathematical Physics)	3
MATH 8615	Algebraic Geometry I	3
MATH 8520	Analytic Number Theory	3
MATH 8511	Commutative Algebra II	3
MATH 8446	Partial Differential Equations II	3
MATH 8618	Introduction to Algebraic Topology	3
MATH 8616	Algebraic Geometry II	3

Plan of Study

Year 0 courses include basic advanced undergraduate material, which incoming Ph.D. students are required to master before engaging in graduate coursework. Well prepared incoming students can petition to skip some or all of the Year 0 courses. The Director of Graduate Studies will administer an informal exam to see if the students are sufficiently ready to skip Year 0 courses.

Fall	CR	Spring	CR
MATH 7700	3	MATH 7900	3
MATH 8655	3	MATH 7940	3
MATH 7920	3	MATH 7720	3
	9		9

Total Credits: 18

Year 1 courses will train students to develop a common solid foundation on basic graduate mathematics. The Ph.D. student is required to pass all 6 courses, and to pass qualifying exams in Algebra and Real Analysis. The qualifying exams will be given in May of each year, shortly after finals week. There will be an opportunity to retake a qualifying exam in August

just before the beginning of the Fall semester. The Analysis qualifying exams will be from topics from Real Analysis I and Real Analysis II. The Algebra qualifying exams will be from topics from Algebra I and Algebra II.

Extremely well prepared students, with the permission of their initial advisor and the Director of Graduate studies, may take one or both qualifying exams in August before they start their first semester. If they pass, then with the permission of their initial advisor and the Director of Graduate studies they may skip the corresponding courses in Year 1.

Year 1: Take All 6

First Year

Fall	CR	Spring	CR
MATH 8420	3	MATH 8421	3
MATH 8410	3	MATH 8411	3
MATH 8425	3	MATH 8502 (.1†)	3
	9		9

Total Credits: 18

† Here, and elsewhere in this document, the number after the period refers to the section number.

Year 2 and above are the post-qual core courses. Every Ph.D. student must complete at least six of the post-qual core courses. (Note that the parity of the year is determined by the beginning of the AY. For example, Spring 2023 occurs in the beginning of AY 2022, and so would be considered to be in an odd year.)

Year 2 and above: Minimum 6 classes

Even Years

Fall		Spring	
MATH 8630	Harmonic Analysis I	MATH 8402	Topics in Mathematical Physics (Mathmatical Physics)
MATH 8440	Advanced Ordinary Differential Equations I	MATH 8302	Topics in Harmonic Analysis (Theory of Distributions)
MATH 8521	Algebraic Number Theory	MATH 8480	Advanced Probability
MATH 8510	Commutative Algebra I	MATH 8650	Differentiable Manifolds and Riemannian Geometry
MATH 8628	Functional Analysis I	MATH 8631	Harmonic Analysis II
MATH 8445	Partial Differential Equations I	MATH 8511	Commutative Algebra II

Odd Years

Fall		Spring	
MATH 8630	Harmonic Analysis I	MATH 8631	Harmonic Analysis II
MATH 8445	Partial Differential Equations I	MATH 8446	Partial Differential Equations II

Mizzou
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MATH 8440	Advanced Ordinary Differential Equations I	MATH 8480	Advanced Probability
MATH 8615	Algebraic Geometry I	MATH 8618	Introduction to Algebraic Topology
MATH 8520	Analytic Number Theory	MATH 8616	Algebraic Geometry II

Some of the above courses are listed in the catalog under different names. Others are new courses, and are currently listed as topics courses until we are able to add them to the catalog.

The candidate must further complete a course of study approved by the doctoral program committee and pass a comprehensive examination. The active areas of research interest of the current members of the staff are: algebraic geometry, analysis (real, complex, functional and harmonic), analytic functions, applied mathematics, financial mathematics and mathematics of insurance, commutative rings, scattering theory, differential equations (ordinary and partial), differential geometry, dynamical systems, general relativity, mathematical physics, number theory, probabilistic analysis and topology.

Note: A student's Doctoral Committee retains the discretion to impose a foreign language proficiency requirement.

Admission Criteria

Note: Applicants for any graduate degree in mathematics should submit an application for graduate study. International Applicants applying from outside North America who seek financial support from the Department will only be considered for the PhD program.

 Fall deadline: January 15

- While a bachelor's degree from an accredited institution is required, the undergraduate major need not be mathematics as long as applicants have had sufficient mathematics training to qualify for 8000-level courses during the first three semesters of graduate work.
- Minimum TOEFL scores:

Internet-based test (iBT)	Paper-based test (PBT)
61 Effective July 1, 2015 must have score of 80.	500 Effective July 1, 2015 must have score of 550.

Important Notes: International applicants seeking departmental support are required to have a minimum TOEFL score of 85 (Internet-based test) or equivalent. An ibtTOEFL Speaking subscore of 22 or higher is preferred.

- Minimum IELTS score:

Item	Score
OVERALL	5.5

Required Application Materials

- 3 or more letters of recommendation from your professors or persons who assess in detail your academic performance and potential.
- Transcripts
- Personal Statement
- TOEFL or IELTS (International students only)

Note: The application is submitted through the Graduate School's ApplyYourself (https://gradschool.missouri.edu/admissions/) system.

Completing the ApplyYourself Application

The application consists of four subsections.

- Personal Information: Complete all information as requested.
- Application Information: Applications are considered only starting Fall Semester, and only for Full-time study. Select a degree from the Graduate Degrees offered by the MU Mathematics Department.
- Indicate your selection for the Mathematics Doctor of Philosophy (PhD)
- Admissions Category: Graduate Degree Sought at MU: Doctorate
- Graduate Program to which you are seeking admissions: Mathematics Doctor of Philosophy (PhD)
- Educational History: Complete all information as requested.
- Test Information:
    - MU's Institutional Code for the TOEFL is: 6875.

Supplemental Information

- (required) Upload your Personal Statement, Statement of Goals or Statement of Purpose.
- Please indicate the specific degree for which you are applying, any additional degrees for which you may later apply, and explain your reasons for choosing to pursue these degrees at the University of Missouri. Note that admissions criteria for the PhD are more stringent than for the Master's. MU PhD students can later add a Master's degree to their program of study without requiring departmental approval. MU Master's students who wish to later add the PhD to their program of study require departmental evaluation and approval.
- (optional) Upload your résumé or curriculum vita.
- (optional) Upload your writing sample.
- You may submit samples of your mathematical writings, publications, or pre-prints. Please limit to 10 pages.
- (optional) Upload any other supporting documents
- Unofficial copies of transcripts uploaded by applicant can be used for initial evaluation- official transcripts sent directly to the Graduate Admissions Office will still be required to finalize admission

RECOMMENDATIONS: The ApplyYourself system will let you request confidential online recommendation letters from your recommendation providers. You need to provide the names and email addresses of recommendation providers who have agreed in advance to write letters for you. The Mathematics Department application requires at least three recommendation letters from your professors (or persons who assess in detail your academic performance and potential).

International Applicants Only

- Unofficial copies of TOEFL/IELTS reports uploaded by applicant can be used for initial evaluation - official reports sent directly to the Graduate Admissions Office will still be required to finalize admission
- Affidavit of Support for International Applicants: It is not necessary to complete this form. International applicants are required to complete the Affidavit of Support or provide a letter of support from a University of Missouri graduate degree program before immigration documents can be issued. All international admissions to the Mathematics graduate program come with financial support which suffices to meet this requirement.

The following (paper) application materials must be on file at the Graduate Admissions office before an admission offer can be finalized:

- Official transcripts/mark sheets from each college or university you have attended (sent directly from the college or university). Applicants with degrees from outside the United States must provide academic credentials in both the native language and in English.
- Official TOEFL or IELTS scores (sent directly from the testing service). Please review the Graduate School's policy regarding proof of English Language proficiency.

Please arrange to have these materials mailed to the following address:

University of Missouri-Columbia
Graduate Admissions
210 Jesse Hall
Columbia, MO 65211
1-800-877-6312
(573) 884-8488

Admission Contact Information

Calin Chindris, Director of Graduate Studies
305 Mathematical Sciences Building
Columbia, MO 65211
(573)-882-4125

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