

# MATHEMATICS: MATH DOCTORAL PREPARATION, BSLAS

for the degree of Bachelor of Science in Liberal Arts & Sciences Major in Mathematics, Math Doctoral Preparation Concentration

Mathematics is a broad discipline that contains a range of areas of specialization within it. The required core courses provide fundamental background for mathematics in general. The concentrations allow the student to broaden this background or begin to specialize. Students must complete the core courses and a concentration.

An entering student in mathematics should have academic preparation to enroll in MATH 220 (<http://catalog.illinois.edu/search/?P=MATH%20220>) during the first semester. Admission to MATH 220 (<http://catalog.illinois.edu/search/?P=MATH%20220>) requires an acceptable ALEKS score. A student should attain grades of B in calculus in order to complete the advanced courses successfully.

## Undergraduate programs in Mathematics

- Actuarial Science, BSLAS (<http://catalog.illinois.edu/undergraduate/las/actuarial-science-bslas/>)
- Mathematics, BSLAS (<http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/#text>)
- Mathematics & Computer Science, BSLAS ([http://catalog.illinois.edu/undergraduate/eng\\_las/mathematics-computer-science-bslas/](http://catalog.illinois.edu/undergraduate/eng_las/mathematics-computer-science-bslas/))

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### Graduation Requirements

Minimum hours required for graduation: 120 hours.

Minimum required major and supporting course work: Normally equates to 60-64 hours including 27-35 hours of mathematics beyond calculus, 3-4 hours of computer science, and 12 hours of supporting coursework. Twelve (12) hours of 300- and 400-level non-S/U-graded courses in the major must be taken on this campus.

### University Requirements

Minimum of 40 hours of upper-division coursework, generally at the 300- or 400-level. These hours can be drawn from all elements of the degree. Students should consult their academic advisor for additional guidance in fulfilling this requirement.

The university and residency requirements can be found in the Student Code (<https://studentcode.illinois.edu/article3/part8/3-801/>) (§ 3-801) and in the Academic Catalog (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

### General Education Requirements

Follows the campus General Education (Gen Ed) requirements (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>). Some Gen Ed

requirements may be met by courses required and/or electives in the program.

Code	Title	Hours
	Composition I	4-6
	Advanced Composition	3
	Humanities & the Arts (6 hours)	6
	Natural Sciences & Technology (6 hours)	6
	Social & Behavioral Sciences (6 hours)	6
	Cultural Studies: Non-Western Cultures (1 course)	3
	Cultural Studies: US Minority Cultures (1 course)	3
	Cultural Studies: Western/Comparative Cultures (1 course)	3
	Quantitative Reasoning (2 courses, at least one course must be fulfilled by CS 101 or CS 124; MATH 220 or MATH 221; MATH 231, MATH 241)	6-10
	Language Requirement (Completion of the fourth semester or equivalent of a language other than English is required)	0-20

Code	Title	Hours
<b>Orientation and Professional Development</b>		
LAS 101	Design Your First Year Experience	1
	OR	
LAS 100 & LAS 101	Success in LAS for International Students and Design Your First Year Experience	3
	OR	
LAS 102	Transfer Advantage	1

Code	Title	Hours
<b>Required Core Courses</b>		
MATH 220 or MATH 221	Calculus I	4 or 5
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 347 or MATH 314	Fundamental Mathematics / Introduction to Higher Mathematics	3 or 4
MATH 416	Abstract Linear Algebra	3
MATH 417 or MATH 427	Intro to Abstract Algebra / Honors Abstract Algebra	3
MATH 461 or STAT 400	Probability Theory / Statistics and Probability I	3 or 4
CS 101 or CS 124	Intro Computing: Engrg & Sci / Introduction to Computer Science I	3
	Approved supporting coursework outside Mathematics (Supporting coursework may be completed with 12 advisor-approved hours of a single math-related area outside of MATH/ASRM not used for a major requirement and must include at least one advanced course; ANY minor which is fulfilled with at least 12 hours of courses, including one advanced course, not used for the major nor cross-listed with MATH/ASRM; or any double major or dual degree.)	12

Code	Title	Hours
<b>Math Doctoral Preparation Concentration</b>		
The courses chosen from the Core and the Math Doctoral Preparation Concentration must include at least two honors courses chosen from: MATH 416, MATH 424, MATH 425, MATH 427, MATH 428.		
MATH 424 or MATH 447	Honors Real Analysis Real Variables	3
MATH 418 or MATH 428	Intro to Abstract Algebra II Honors Topics in Mathematics	3
MATH 448	Complex Variables	3
MATH 423 or MATH 425 or MATH 432 or MATH 481	Differential Geometry Honors Advanced Analysis Set Theory and Topology Vector and Tensor Analysis	3
MATH 441	Differential Equations	3
Two additional 400-level or approved 500-level MATH courses that are not graded as S/U.		6

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## Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence.

Students must fulfill their Language Other Than English requirement by successfully completing a fourth level of a language other than English. See the corresponding section on the Degree and General Education Requirements page (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

<b>First Year</b>			
First Semester	Hours	Second Semester	Hours
MATH 220 or 221	4	MATH 231	3
Composition I or General Education course	3	CS 101 or 124	3
Language Other than English (3rd level)	4	General Education course or Composition I	4
General Education course	3	Language Other than English (4th level)	4
LAS 101 (or Elective)	1		
		<b>15</b>	<b>14</b>

<b>Second Year</b>			
First Semester	Hours	Second Semester	Hours
MATH 241	4	MATH 416	3

MATH 347	3	MATH 461 or STAT 400	3
General Education course	3	Supporting Coursework	3
General Education course	3	General Education course	3
Free elective course	3	General Education course	3
		<b>16</b>	<b>15</b>

<b>Third Year</b>			
First Semester	Hours	Second Semester	Hours
MATH 424, 444, or 447	3	MATH 423, 425, 432, or 481	3
MATH 441	3	400 level MATH course (may not use an S/U-graded course)	3
General Education course	3	General Education course	3
Supporting Coursework	3	Supporting Coursework	3
Free elective course	3	Free elective course	3
		<b>15</b>	<b>15</b>

<b>Fourth Year</b>			
First Semester	Hours	Second Semester	Hours
MATH 427 or 417	3	MATH 418 or 428	3
MATH 448	3	400-level MATH course	3
General Education course	3	General Education course	3
Upper-division Supporting Coursework	3	Free elective course	3
Free elective course	3	Free elective course	3
		<b>15</b>	<b>15</b>

### Total Hours 120

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Students with a BSLAS degree in Mathematics will be able to:

1. construct proofs and recognize when proofs are complete.
2. use theorems in order to solve problems.
3. demonstrate technical proficiency in calculus and linear algebra.
4. apply mathematics; translating real-world problems into mathematical problems and solving them.

Additionally, students in this concentration will gain a proficiency with abstract mathematics at the level required for graduate study and beyond.

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## **Department of Mathematics (<https://math.illinois.edu/>)**

Mathematics Faculty (<https://math.illinois.edu/directory/faculty/>)  
Math Advising (<https://math.illinois.edu/academics/undergraduate-program/undergraduate-advising/>)  
[mathadvising@illinois.edu](mailto:mathadvising@illinois.edu)

## **College of Liberal Arts & Sciences (<https://las.illinois.edu/>)**

LAS Admissions and Requirements Overview (<http://catalog.illinois.edu/schools/las/>)