MATHEMATICS: DATA OPTIMIZATION, BSLAS

for the degree of Bachelor of Science in Liberal Arts & Sciences Major in Mathematics, Data Optimization 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/)

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Graduation Requirements

Minimum hours required for graduation: 120 hours.

Minimum required major and supporting course work: Normally equates to 54-58 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

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 Quantitative Reasoning I)		6-10
fulfilled by CS 101 or CS 124; MATH 220 or MATH 221; MATH 231, MATH 241		
Language Requirement (Completion of the fourth semester or equivalent of a language other than English is required)		0-20

Code	Title	Hours
Orientation and Professional Development		
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
Major Core Requirements		
MATH 220	Calculus	4 or 5
or MATH 221	Calculus I	
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 347	Fundamental Mathematics	3 or 4
or MATH 314	Introduction to Higher Mathematics	
MATH 416	Abstract Linear Algebra	3
MATH 417	Intro to Abstract Algebra	3
or MATH 427	Honors Abstract Algebra	
MATH 461	Probability Theory	3 or 4
or STAT 400	Statistics and Probability I	
CS 101	Intro Computing: Engrg & Sci	3
or CS 124	Introduction to Computer Science I	
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
Data Optimization Concentration		
MATH 444	Elementary Real Analysis	3
or MATH 447	Real Variables	
or MATH 424	Honors Real Analysis	
CS/MATH 357	Numerical Methods I	3
MATH 412	Graph Theory	3
or MATH 484	Nonlinear Programming	
STAT 410/MATH 464	Statistics and Probability II	3

or STAT 420/ ASRM 450	Methods of Applied Statistics	
MATH 482	Linear Programming	3

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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/).*

First Year

First Semester	Hours	Second Semester	Hours
MATH 220 or 221	4	MATH 231	3
Composition I or General Education course	3	CS 101 (or CS 124 or CS 125)	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	1		
	15		**14**

Second Year

First Semester	Hours	Second Semester	Hours
MATH 241	4	MATH 347	3
General Education course	3	MATH 461 or STAT 400	4
General Education course	3	Supporting Coursework	3
Free elective course	3	General Education course	3
Supporting Coursework	3	Free elective course	2
	16		**15**

Third Year

First Semester	Hours	Second Semester	Hours
MATH 416	3	MATH 444 (or MATH 447 or MATH 424)	3
STAT 410 or 420	3	CS 357	3
General Education course	3	General Education course	3
Free elective course	3	Free elective course	3
Supporting Coursework	3	Supporting Coursework	3
	15		**15**

Fourth Year

First Semester	Hours	Second Semester	Hours
MATH 417 or 427	3	MATH 412 or 484	3
MATH 482	3	General Education course	3
General Education course	3	General Education course	3
Free elective course	3	Free elective course	3
Free elective course	3	Free elective course	3
	15		**15**

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 be able to translate real-world data problems, especially those involving high-dimensionality and networks, into solid mathematical formulations.

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Department of Mathematics (https://math.illinois.edu/)

Department of Mathematics faculty (https://math.illinois.edu/directory/ faculty/)
Mathematics Advising (https://math.illinois.edu/academics/ undergraduate-program/undergraduate-advising/)
mathadvising@illinois.edu

College of Liberal Arts and Sciences (https://las.illinois.edu/)

Overview of Admissions & Requirements for the College of LAS (http:// catalog.illinois.edu/schools/las/academic-units/)