# MATHEMATICS, BSLAS

*for the degree of Bachelor of Science in Liberal Arts & Sciences Major in Mathematics*

Students in the Mathematics major can choose one of the following to complete the major:

- **Mathematics major (p. 1)**
- **Mathematics major, Applied Mathematics concentration (http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/applied-mathematics/)**
- **Mathematics major, Data Optimization concentration (http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/data-optimization/)**
- **Mathematics major, Math Doctoral Preparation concentration (http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/math-doctoral-preparation/)**
- **Mathematics major, Mathematics Teaching concentration (http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/teaching-mathematics/)**

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 (p. 1)
- Mathematics & Computer Science, BSLAS (http://catalog.illinois.edu/undergraduate/eng_las/mathematics-computer-science-bslas/)

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A Major Plan of Study form, declaring concentration and supporting coursework, must be completed and submitted to the LAS Student Academic Affairs Office except for students in the Teaching of Mathematics concentration. Please complete this form with an advisor in the Mathematics Undergraduate Office within 1-2 semesters of completing MATH 347 or MATH 348.

**Departmental distinction:** Distinction will be awarded on the basis of selection of 400-level courses in mathematics and the grade point average. Graduation with High Distinction or Highest Distinction in Mathematics requires participation in the Program for Distinction in Mathematics or Mathematics Education. Full details are available at the departmental website.

**Graduation Requirements**

Minimum hours required for graduation: 120 hours.

Minimum required major and supporting course work: Normally equates to 54-59 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 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 |
| **Note: An optional concentration may be elected, please talk to an advisor. Students who do not elect an optional concentration are required to take the math major coursework below.** | | |
| **Mathematics Major Coursework** | | |
| Analysis Requirement | | 3 |
| MATH 444 | Elementary Real Analysis | |
| or MATH 447 | Real Variables | |
| or MATH 424 | Honors Real Analysis | |
| Breadth Requirement. Select a total of two courses from the following list of eight courses: | | 6 |
| MATH 402 | Non Euclidean Geometry | |
| MATH 403 | Euclidean Geometry | |
| MATH 423 | Differential Geometry | |
| MATH 441 | Differential Equations | |
| MATH 446 | Applied Complex Variables | |
| MATH 448 | Complex Variables | |
| MATH 453 | Number Theory | |
| MATH 481 | Vector and Tensor Analysis | |
| 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/*).*

**First Year**

| First Semester | Hours | Second Semester | Hours |
|---|---|---|---|
| MATH 220 or 221 | 4 | MATH 231 | 3 |
| Composition I or General Education course | 4 | CS 101 or 124 | 3 |
| Language Other than English (3rd level) | 4 | Language Other than English (4th level) | 4 |
| General Education course | 3 | General Education course or Composition I | 3 |
| LAS 101 (or Elective) | 1 | General Education course | 3 |
| | **16** | | **16** |

**Second Year**

| First Semester | Hours | Second Semester | Hours |
|---|---|---|---|
| MATH 241 | 4 | MATH 314 or 347 | 3 |
| General Education course | 3 | STAT 400 or MATH 461 | 4 |
| General Education course | 3 | General Education course | 3 |
| Free elective course | 3 | General Education course | 3 |
| Free elective course | 2 | Free elective course | 3 |
| | **15** | | **16** |

**Third Year**

| First Semester | Hours | Second Semester | Hours |
|---|---|---|---|
| MATH 416 | 3 | MATH 444 (or 447 or 424) | 3 |
| MATH course, Breadth Requirement | 3 | MATH course, Breadth Requirement | 3 |
| General Education course | 3 | General Education course | 3 |
| General Education 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 | 400 level MATH course (may not use an S/U-graded course) | 3 |

| | | | |
|---|---|---|---|
| 400 level MATH course (may not use an S/U-graded course) | 3 | Upper-division Supporting Coursework | 3 |
| Supporting coursework | 3 | Free Elective | 3 |
| Free Elective | 3 | Free Elective | 3 |
| Free Elective | 3 | | |
| | **15** | | **12** |

**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.

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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/)