Bachelor of Arts in Mathematics

Why study mathematics?
Because mathematics is a framework upon which humanity builds an understanding of the world.

Mathematics Programs
Separate programs lead to the B.A. in mathematics and the B.S. in mathematics. The B.A. has fewer mathematics course requirements and more general education requirements. The B.S. requires more mathematics courses, an applied mathematics concentration, and fewer general education courses. Students wishing to attend graduate school in mathematics or to pursue a career that makes substantial use of mathematics (as an actuary, for example) should get a B.S. in mathematics. Many students majoring in mathematics are interested in a liberal arts degree; such students may want to consider the B.A. in mathematics. Students who wish to teach mathematics in high school should pursue a B.A. or B.S. in mathematics while participating in the UKanTeach program (http://ukanteach.ku.edu).

Requirements for the B.A. Major

Mathematics Core Knowledge and Skills (20)
Majors must complete courses as specified in each of the following areas:

Calculus I. Satisfied by one of the following:
- MATH 125 Calculus I 4
- or MATH 145 Calculus I, Honors

Calculus II. Satisfied by one of the following:
- MATH 126 Calculus II 4
- or MATH 146 Calculus II, Honors

Calculus III. Satisfied by one of the following:
- MATH 127 Calculus III 4
- or MATH 147 Calculus III, Honors

Elementary Linear Algebra. Satisfied by one of the following:
- MATH 290 Elementary Linear Algebra 2
- or MATH 291 Elementary Linear Algebra, Honors

Analysis. Satisfied by one of the following:
- MATH 500 Intermediate Analysis 3
- or MATH 765 Mathematical Analysis I

Linear Algebra. Satisfied by one of the following:
- MATH 590 Linear Algebra 3
- or MATH 790 Linear Algebra II

Math Sequence Requirement (6)
Majors must choose one of the following 2-course sequences. Courses selected above may contribute to the minimum of 6 hours.

Probability & Statistics. Satisfied by:
- MATH 627 Probability
- & MATH 628 and Mathematical Theory of Statistics

Geometry. Satisfied by:
- MATH 660 Geometry I
- & MATH 661 and Geometry II

Mathematical Analysis I
- MATH 765 Mathematical Analysis I
- & MATH 766 and Mathematical Analysis II

Numerical Analysis. Satisfied by:
- MATH 781 Numerical Analysis I
- & MATH 782 and Numerical Analysis II

Linear & Modern Algebra. Satisfied by:
- MATH 790 Linear Algebra II
- & MATH 791 and Modern Algebra

Analysis & Complex Variables. Satisfied by:
- MATH 500 Intermediate Analysis
- & MATH 646 and Complex Variable and Applications

Statistics & Regression Analysis. Satisfied by:
- MATH 526 Applied Mathematical Statistics I
- & MATH 605 and Applied Regression Analysis

Statistics & Time Series Analysis. Satisfied by:
- MATH 526 Applied Mathematical Statistics I
- & MATH 611 and Time Series Analysis

Number Theory & Introductory Modern Algebra. Satisfied by:
- MATH 540 Elementary Number Theory
- & MATH 558 and Introductory Modern Algebra

Modern Algebra & Coding Theory. Satisfied by:
- MATH 558 Introductory Modern Algebra
- & MATH 601 and Algebraic Coding Theory

Numerical Methods & Linear Algebra. Satisfied by:
- MATH 581 Numerical Methods
- & MATH 591 and Applied Numerical Linear Algebra

Linear Algebra. Satisfied by:
- MATH 590 Linear Algebra
- & MATH 790 and Linear Algebra II

Complex Variables & Partial Differential Equations. Satisfied by:
- MATH 646 Complex Variable and Applications
- & MATH 647 and Applied Partial Differential Equations

Partial Differential Equations & Calculus of Variations. Satisfied by:
- MATH 647 Applied Partial Differential Equations
- & MATH 648 and Calculus of Variations and Integral Equations

Combinatorics & Graph Theory. Satisfied by:
- MATH 724 Combinatorial Mathematics
- & MATH 725 and Graph Theory

Math Breadth (15)
Majors must complete a minimum of 5 mathematics courses numbered 300 and above (each at least 3 credits), excluding MATH 365, MATH 409 and MATH 410, but including the upper division courses used to satisfy the core and sequence requirements. The goals are to gain exposure to a variety of concepts and methods in mathematics, develop abstract and critical thinking, and acquire knowledge to prepare for a career using mathematics, further study of mathematics, or interdisciplinary work involving mathematics.

Major Hours & Major GPA
While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours
Satisfied by 30 hours of major courses.

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

### Major Junior/Senior Hours
Satisfied by a minimum of 15 hours from junior/senior courses (300+) in the major.

### Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator [here](http://clas.ku.edu/undergrad/tools/gpa).

Below is a sample 4-year plan for students pursuing the BA in Mathematics. To view the list of courses approved to fulfill KU Core Goals, please visit the KU Core website [here](http://kucore.ku.edu/courses).

This degree plan assumes students will have the equivalent of MATH 101 prior to freshman year, fall semester.

### Freshman

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Hours Spring</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ENGL 101 (Goal 2.1 (2 crs req), BA Writing I)</td>
<td>3 ENGL 102 (Goal 2.1 (2 crs req), BA Writing II)</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 125 or 145 (Goal 1.2 Quantitative Reasoning, BA Quant Req)</td>
<td>4 MATH 126 or 146 (Major Requirement)</td>
<td>4</td>
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</tr>
<tr>
<td></td>
<td>1st Semester Language (BA Second Language)</td>
<td>5 2nd Semester Language (BA Second Language)</td>
<td>5</td>
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<tr>
<td></td>
<td>First Year Seminar (Goal 1.1 Critical Thinking)</td>
<td>3 Goal 2.2 Communication</td>
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</table>

**Total Hours:** 15

### Sophomore

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Hours Spring</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MATH 127 or 147 (Major Requirement)</td>
<td>4 MATH 590 (Major Requirement)</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>MATH 290 or 291 (Major Requirement)</td>
<td>2 4th Semester Language, or 1st semester of Another Language (BA Second Language)</td>
<td>3-5</td>
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<tr>
<td></td>
<td>3rd Semester Language (BA Second Language)</td>
<td>3 Goal 3 Social Science</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>Goal 3 Natural Science</td>
<td>3 Goal 4.2 Global Awareness</td>
<td>3</td>
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<tr>
<td></td>
<td>Lab Science (BA Lab Requirement)</td>
<td>1-2 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
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<tr>
<td></td>
<td>Elective or possible minor course 300+ (Total Hours)</td>
<td>3 Elective (Total Hours)</td>
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**Total Hours:** 16-17

### Junior

<table>
<thead>
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<th>Course</th>
<th>Hours Spring</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MATH 500 (Major Requirement)</td>
<td>3 Math Sequence Course 300+ (Major Requirement²)</td>
<td>3</td>
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<tr>
<td></td>
<td>Goal 3 Humanities</td>
<td>3 Math Elective or Sequence Course 300+ (Major Requirement²)</td>
<td>3</td>
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<td></td>
<td>Goal 4.1 US Diversity</td>
<td>3 Goal 5 Social Responsibility &amp; Ethics</td>
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<tr>
<td></td>
<td>Elective or possible minor course 300+ (Total Hours)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
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**Total Hours:** 16-18

### Senior

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Hours Spring</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Math Sequence Course 300+ (Major Requirement)²</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
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<tr>
<td></td>
<td>Math Sequence Course 300+ (Goal 6 Integration &amp; Creativity)³</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
<td></td>
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<tr>
<td></td>
<td>Elective or possible minor course 300+ (Total Hours)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
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<td></td>
<td>Elective or possible minor course 300+ (Total Hours)</td>
<td>3 Elective or possible minor course 300+ (Total Hours)</td>
<td>3</td>
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</tbody>
</table>

**Total Hours:** 120-123

1. The BA requires completion of two courses of collegiate-level writing instruction. Students who test out of Composition will still need to complete ENGL 102 (or equivalent) and one additional Goal 2.1 course.
2. Majors must complete a 2-course sequence ([here](http://catalog.ku.edu/liberal-arts-sciences/math/ba/#requirementstext)). Courses selected to fulfill other major requirements, may also contribute to the minimum of 6 hours for the sequence.
3. Completion of four upper division mathematics courses that form two sequences in mathematics and statistics can fulfill KU Core Goal 6 ([here](http://kucore.ku.edu/experiences)).

Please note:
All students in the College of Liberal Arts and Sciences are required to completed 120 total hours of which 45 hours must be at the Jr/Sr (300+) level.

The same course cannot be used to fulfill more than one KU Core Goal. However, overlap of a KU Core course with a major or degree-specific requirement is allowed. Overlapping is recommended to allow more opportunities to explore other majors and/or minors.

### Departmental Honors
For undergraduate departmental honors, the student must satisfy the College requirements for honors, attain a grade-point average of 3.5 in all mathematics courses numbered 500 and above. The student must also complete two out of the following four sequences: MATH 727 and MATH 728; MATH 765 and MATH 766; MATH 781 and MATH 782; and MATH 790 and MATH 791, with a grade no lower than B- in each of these courses. The student must make a satisfactory oral presentation to the department, preferably on a topic related to his or her mathematics course work. Preparation should include enrollment in MATH 699 Directed Reading (for 1 or more credit hours) with a faculty mentor.