# MATHEMATICS & COMPUTER SCIENCE, BSLAS

For the degree of Bachelor of Science in Liberal Arts & Sciences Major in Mathematics & Computer Science

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## Undergraduate programs in Mathematics

- Actuarial Science, BSLAS ([http://catalog.illinois.edu/undergraduate/las/actuarial-science-bslas/](http://catalog.illinois.edu/undergraduate/las/actuarial-science-bslas/))
- Mathematics, BSLAS ([http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/#text](http://catalog.illinois.edu/undergraduate/las/mathematics-bslas/#text))
- Mathematics & Computer Science, BSLAS (p. 1)

For the degree of Bachelor of Science in Liberal Arts and Sciences: Major in Mathematics & Computer Science

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### Departmental distinction:

To graduate with distinction requires a specified minimum grade point average in all Computer Science and Mathematics courses listed below. A GPA of 3.25 is required for Distinction, 3.5 for High Distinction, and 3.75 for Highest Distinction.

In addition, students must complete at least three semester hours of additional Computer Science or Mathematics courses selected from the following:

- CS 196, CS 296, CS 397, CS 493, CS 499, any CS course numbered 411 or higher,
- MATH 412, MATH 414, MATH 417, MATH 418, MATH 423, MATH 432, MATH 448, MATH 482, MATH 484, MATH 496.

**NOTE:** A student taking a cross-listed course in this major may designate it as either mathematics or computer science.

### General education:

Students must complete the [Campus General Education](https://courses.illinois.edu/) requirements including the campus general education language requirement.

Minimum required major and supporting course work: Normally equates to 71-75 hours. Twelve hours of 300- and 400-level in the major must be taken on this campus.

Minimum hours required for graduation: 120 hours.

### Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 100</td>
<td>Computer Science Orientation (recommended)</td>
<td>1</td>
</tr>
<tr>
<td>Calculus through MATH 241-Calculus III</td>
<td>11-12</td>
<td></td>
</tr>
<tr>
<td>CS 124</td>
<td>Introduction to Computer Science I</td>
<td>3</td>
</tr>
<tr>
<td>CS 128</td>
<td>Introduction to Computer Science II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 347</td>
<td>Fundamental Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 348</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 173</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CS 225</td>
<td>Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>CS 222</td>
<td>Software Design Lab</td>
<td>1</td>
</tr>
<tr>
<td>Choose one of the following combinations</td>
<td>8-11</td>
<td></td>
</tr>
<tr>
<td>CS 233</td>
<td>Computer Architecture System Programming</td>
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<tr>
<td>&amp; CS 341</td>
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<tr>
<td>OR</td>
<td>CS 340</td>
<td>Introduction to Computer Systems</td>
</tr>
</tbody>
</table>

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CS/MATH 357 Numerical Methods I 3
CS 374 Introduction to Algorithms & Models of Computation 4
CS 421 Programming Languages & Compilers 3
CS 450 Numerical Analysis 3
MATH 415 Applied Linear Algebra 3
or MATH 416 Abstract Linear Algebra 3

400-level mathematics and computer science requirements: 18

Students must select at least six 400-level mathematics and computer science courses, including one from each of the following groups:

**GROUP I**

- CS 361 Probability & Statistics for Computer Science (recommended)
- MATH 461 Probability Theory
- STAT 400/ MATH 463 Statistics and Probability I

**GROUP II**

- MATH 412 Graph Theory
- MATH 413 Intro to Combinatorics
- MATH 417 Intro to Abstract Algebra
- MATH 427 Honors Abstract Algebra

**GROUP III**

- MATH 441 Differential Equations
- MATH 446 Applied Complex Variables
- MATH 484 Nonlinear Programming

**GROUP IV**

- MATH 424 Honors Real Analysis
- MATH 444 Elementary Real Analysis
- MATH 447 Real Variables

**GROUP V**

- MATH 414 Mathematical Logic
- CS/MATH 473 Algorithms
- CS/MATH 475 Formal Models of Computation
- CS 476 Program Verification
- CS 477 Formal Software Development Methods

**Total Hours** 71-75

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By the time of graduation, students will have:

**Computer Science:**

1. An ability to apply knowledge of computing and mathematics appropriate to the discipline
2. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
3. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

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4. An ability to function effectively on teams to accomplish a common goal
5. An understanding of professional, ethical, legal, security and social issues and responsibilities
6. An ability to communicate effectively with a range of audiences
7. An ability to analyze the local and global impact of computing on individuals, organizations, and society
8. A recognition of the need for and an ability to engage in continuing professional development
9. An ability to use current techniques, skills, and tools necessary for computing practice
10. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the trade-offs involved in design choices
11. An ability to apply design and development principles in the construction of software systems of varying complexity

Mathematics:

1. An ability to construct proofs and recognize when proofs are complete
2. An ability to use theorems in order to solve problems
3. Technical proficiency in calculus and linear algebra

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**math website:** Mathematics & Computer Science (https://math.illinois.edu/academics/undergraduate-program-mathematics/)

**computer science website:** Mathematics & Computer Science (https://cs.illinois.edu/academics/undergraduate/degree-program-options/bs-mathematics-computer-science/)

**department website:** Mathematics (https://math.illinois.edu/)

**department faculty:** Mathematics Faculty (https://math.illinois.edu/directory/faculty/)

**overview of college admissions & requirements:** Liberal Arts & Sciences (http://catalog.illinois.edu/schools/las/academic-units/)

**college websites:** https://las.illinois.edu/ and https://grainger.illinois.edu (https://grainger.illinois.edu/)

**math email:** mathadvising@illinois.edu

**computer science email:** undergrad@cs.illinois.edu (academic@cs.illinois.edu)

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