# STATISTICS & COMPUTER SCIENCE, BSLAS

*for the degree of Bachelor of Science in Liberal Arts & Sciences in Statistics & Computer Science*

This major is sponsored jointly by the Departments of Statistics and Computer Science. The Statistics and Computer Science major is designed for students who would like a strong foundation in computer science, coupled with significant advanced coursework in statistics. The major prepares students for professional or graduate work in statistics and computer science, and for applications of computing in which knowledge of statistics is particularly important, such as data mining and machine learning.

## Undergraduate degree programs in Statistics

- Statistics, BSLAS (http://catalog.illinois.edu/undergraduate/las/statistics-bslas/#degreerequirementstext)
- Statistics & Computer Science, BSLAS (p. 1)

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**Departmental distinction:** To graduate with distinction requires a specified minimum grade point average in all Computer Science, Statistics, 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.
**General education:** Students must complete the Campus General Education requirements including the campus general education language requirement.
**Minimum required major and supporting course work:** Normally equates to 68-72 hours. At least 12 hours of 300- and 400-level courses must be taken on this campus.
**Minimum hours required for graduation:** 120 hours

| Code | Title | Hours |
|---|---|---|
| CS 100 | Computer Science Orientation (recommended) | 1 |
| **Mathematical Foundation** | | |
| Calculus through MATH 241: Calculus III | | 11-12 |
| MATH 257 | Linear Algebra with Computational Applications | 3 |
| or MATH 415 | Applied Linear Algebra | |
| **Computer Science Foundation** | | |
| CS 124 | Introduction to Computer Science I | 3 |
| CS 128 | Introduction to Computer Science II | 3 |
| CS 173 | Discrete Structures | 3 |
| CS 222 | Software Design Lab | 1 |
| CS 225 | Data Structures | 4 |
| Choose one of the following combinations: | | 8-11 |
| CS 233 & CS 341 | Computer Architecture and System Programming | |
| OR | | |
| CS 340 | Introduction to Computer Systems | |
| & two CS courses at the 400 level above CS 403, excluding CS 421 and CS 491. These two courses must be distinct from all other courses used to fulfill program requirements or options. | | |
| CS 357 | Numerical Methods I | 3 |
| CS 374 | Introduction to Algorithms & Models of Computation | 4 |
| CS 421 | Programming Languages & Compilers | 3 |
| **Probability and Statistics Foundation** | | |
| Choose one of the following: | | 3-4 |
| STAT 107 | Data Science Discovery | |
| STAT 200 | Statistical Analysis | |
| STAT 212 | Biostatistics | |
| STAT 400 | Statistics and Probability I | 4 |
| STAT 410 | Statistics and Probability II | 3 or 4 |
| STAT 425 | Statistical Modeling I | 3 or 4 |
| STAT 426 | Statistical Modeling II | 3 or 4 |
| **Statistical Application Electives -Choose one of the following:** | | **3** |
| STAT 428 | Statistical Computing | |
| STAT 431 | Applied Bayesian Analysis | |
| STAT 432 | Basics of Statistical Learning | |
| STAT 434 | Survival Analysis | |
| STAT 448 | Advanced Data Analysis | |
| **Computational Application Elective - Choose one of the following:** | | **3** |
| CS 410 | Text Information Systems | |
| CS 411 | Database Systems | |
| CS 412 | Introduction to Data Mining | |
| CS 446 | Machine Learning | |
| CS 481 | Advanced Topics in Stochastic Processes & Applications | |
| CS 482 | Simulation | |
| **Total Hours** | | **68-72** |

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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 |
|---|---|---|---|
| STAT 107, 200, or 212 | 4 | CS 128 | 3 |
| CS 100 | 1 | CS 173 | 3 |
| CS 124 | 3 | MATH 231 | 3 |
| MATH 220 or 221 | 5 | General Education course or Composition I | 3 |
| Composition I or General Education course | 4 | General Education course | 3 |
| | **17** | | **15** |

**Total Hours 32**

**Second Year**

| First Semester | Hours | Second Semester | Hours |
|---|---|---|---|
| STAT 400 | 4 | STAT 410 | 3 |
| CS 222 | 1 | CS 340 or 233 | 3 |
| CS 225 | 4 | MATH 257 or 415 | 3 |
| MATH 241 | 4 | General Education course | 3 |
| Language Other than English (3rd level) | 4 | Language Other than English (4th level) | 4 |
| | **17** | | **16** |

**Total Hours 33**

**Third Year**

| First Semester | Hours | Second Semester | Hours |
|---|---|---|---|
| STAT 425 | 3 | STAT 426 | 3 |
| CS 341 (or CS 400-level course) | 4 | CS 374 | 4 |
| CS 357 | 3 | Free Elective course or CS 400-level course | 3 |
| General Education course | 3 | General Education course | 3 |
| Free Elective course | 2 | General Education course | 3 |
| | **15** | | **16** |

**Total Hours 31**

**Fourth Year**

| First Semester | Hours | Second Semester | Hours |
|---|---|---|---|
| CS 421 | 3 | Computational Application Elective course | 3 |
| Statistical Application Elective course | 3 | General Education course | 3 |
| General Education course | 3 | General Education course | 3 |
| Free Elective course | 3 | Free Elective course | 3 |
| | **12** | | **12** |

**Total Hours 24**

**Total Hours: 120**

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Statistics & Computer Science students will:

1. Analyze complex problems and apply principles of statistical reasoning and computing to draw valid conclusions from data.
2. Design, implement, and evaluate a statistically-sound and computing-based answers to interdisciplinary, field-specific problems.
3. Apply mathematical, probabilistic, and computer science theory fundamentals to produce statistical and computing-based solutions.
4. Communicate the results of their analysis effectively in writing, through visualizations, and orally in a variety of professional contexts.
5. Excel in the use of software development, in data management, and in writing statistical code.
6. Be adept in the use of modern methods of computing, statistical machine learning, and data science.
7. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

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# Department of Statistics

- Statistics Undergraduate Advising (https://stat.illinois.edu/academics/undergraduate/advising/)
- Statistics email: stat-undergrad@illinois.edu
- Statistics & Computer Science page (https://siebelschool.illinois.edu/academics/undergraduate/degree-program-options/cs-x-degree-programs/bs-statistics-computer-science/)
- Department of Statistics website
- Department of Statistics faculty

# Siebel School of Computing and Data Science

- Computer Science Undergraduate Advising (https://cs.illinois.edu/academics/undergraduate/undergraduate-advising/)
- Computer Science email: undergrad@cs.illinois.edu
- Statistics & Computer Science page (https://siebelschool.illinois.edu/academics/undergraduate/degree-program-options/cs-x-degree-programs/bs-statistics-computer-science/)
- Siebel School of Computing and Data Science website (https://siebelschool.illinois.edu/)
- Siebel School of Computing and Data Science faculty (https://siebelschool.illinois.edu/about/people/all-faculty/)

# Overview of College Admissions & Requirements

- College of Liberal Arts & Sciences Academics & Admissions (http://catalog.illinois.edu/schools/las/academic-units/)
- College of Liberal Arts & Sciences website (https://las.illinois.edu/)
- Grainger College of Engineering website (https://grainger.illinois.edu)