BIOINFORMATICS: INFORMATION SCIENCES, MS

for the degree of Master of Science in Bioinformatics, Information Sciences Concentration

A typical student will take 6 required courses (24 hours) 1 Biology, 1 Computer Science, 1 Fundamental Bioinformatics, and 3 Information Sciences. The student must then choose 3 courses (12 hours) of electives to complete the degree. It is strongly encouraged that up to 2 courses of these electives (8 hours) are thesis. Our expectation is that each student will arrange a custom program of study, suitable for the information management of their particular biological informatics application. Currently, this program requires students to be in residence in Champaign-Urbana.

The School of Information Sciences (iSchool) offers programs of study leading to the Master of Science (M.S.), the Certificate of Advanced Study (C.A.S.), and the Doctor of Philosophy degrees. Three Master of Science (M.S.) degrees are available. The M.S. in Library and Information Science (L.I.S.) prepares students for professional careers in all types of information organizations, including libraries. The M.S. in Information Management (I.M.) will prepare the students for information-intensive professional roles in a broad range of sectors. The Information Sciences concentration of the campus-wide M.S. in bioinformatics program emphasizes multidisciplinary skills that are required for a career developing and managing information systems for the biological sciences community. The C.A.S. program provides the opportunity

1. to study an aspect of information sciences in greater depth than is possible in the M.S. program,
2. to refresh and upgrade one's professional training several years after completing a M.S. program, or
3. to redirect one's career into a different area of library and information science.

School Librarian Licensure is available in conjunction with both the M.S. in L.I.S. and C.A.S. The Ph.D. is a research degree program.

Admission
The general admission requirements of the Graduate College apply. Consideration is also given to language study and computer skills, relevant work experience, letters of reference, and evidence of leadership. International students must score at least 620 on the paper-based Test of English as a Foreign Language (TOEFL) (260 on the computer-based test; 104 on the iBT version); or 7 on each section of the IELTS. The M.S. in bioinformatics requires a strong background in information science including undergraduate-level computing and mathematics. The C.A.S. requires a master’s degree in library and information science and a grade point average of at least 3.0 (A = 4.0) in the master’s program.

School Librarian Licensure
Candidates interested in the School Librarian Licensure program must first be admitted and enrolled as a degree-seeking student within the School of Information Sciences before their application to the School Librarian Licensure program is reviewed. Accepted students must successfully pass two Illinois State Board of Education testing requirements prior to registration for the final fieldwork experience.

Graduate Teaching Experience
Although teaching is not a general Graduate College requirement, experience in teaching is considered an important part of the graduate experience in the Ph.D. program for those interested in faculty careers.

Facilities and Resources
Among the major areas of faculty research are:

• community informatics
• data analytics
• data curation
• digital humanities
• digital libraries
• history of information
• information retrieval
• organization of knowledge and information
• privacy, security, and trust
• ethics and values for information

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youth literature, culture, and services

The iSchool’s Center for Informatics Research in Science and Scholarship (CIRSS) conducts research on information problems that impact scientific and scholarly inquiry. The Center for Children’s Books (CCB) provides a review and research collection of the newest literature for children and young adults. The Communications Office produces two high-quality publications, Library Trends and The Bulletin of the Center for Children’s Books. The staff of each of these units is available to students and faculty for consultation and guidance. A computer network with Internet connectivity is integral to teaching and learning activities. The University Library provides a vast reservoir of resources for all types of study and research in library and information science.

The School maintains an ongoing commitment to continuing education through conferences, institutes, workshops, and course offerings.

Financial Aid
Financial aid may be available from the iSchool, the University Library, and elsewhere in the University in the form of graduate assistantships, teaching assistantships, research assistantships, and hourly paid work. Area libraries may provide pre-professional or hourly positions. Also, the iSchool offers a limited number of fellowships for which doctoral students tend to be favored over C.A.S. and master’s degree students. Students in the joint program that do not hold a FLAS fellowship are eligible for, but not guaranteed, fellowship or assistantship support in the semesters in which they are enrolled in the iSchool. Any assistantship awarded to these students provides a waiver of the base in-state tuition and service fee as well as a stipend. Non-Illinois residents must pay the difference between in- and out-of-state tuition.

for the degree of Master of Science in Bioinformatics, Information Sciences Concentration

For additional details and requirements, refer to the unit’s Graduate Programs of Study (https://ischool.illinois.edu/degrees-programs/) and the Graduate College Handbook (https://grad.illinois.edu/gradhandbook/).

Thesis or Non Thesis Option

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<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td></td>
<td>Computer Science and Informatics (choose one)</td>
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<tr>
<td>CS 411</td>
<td>Database Systems</td>
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<tr>
<td>CS 466</td>
<td>Introduction to Bioinformatics</td>
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<td>CS 473</td>
<td>Algorithms</td>
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<tr>
<td>CPSC 565</td>
<td>Perl &amp; UNIX for Bioinformatics</td>
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<tr>
<td>IS 455</td>
<td>Database Design and Prototyping</td>
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<tr>
<td>IS 507</td>
<td>Data, Statistical Models and Information</td>
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<td>STAT 428</td>
<td>Statistical Computing</td>
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<td>STAT 440</td>
<td>Statistical Data Management</td>
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<td>STAT 448</td>
<td>Advanced Data Analysis</td>
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<td>STAT 480</td>
<td>Big Data Analytics</td>
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<tr>
<td>STAT 525</td>
<td>Computational Statistics</td>
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<td>Fundamental Bioinformatics (choose one)</td>
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<tr>
<td>ANSC 542</td>
<td>Applied Bioinformatics</td>
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<td>ANSC 545</td>
<td>Statistical Genomics</td>
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<td>CHBE 571</td>
<td>Bioinformatics</td>
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<tr>
<td>CPSC 567</td>
<td>Bioinformatics &amp; Systems Biol</td>
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<td>CS 466</td>
<td>Introduction to Bioinformatics</td>
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<tr>
<td>IB 467</td>
<td>Principles of Systematics</td>
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<td>MCB 432</td>
<td>Computing in Molecular Biology</td>
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<td>Biology (choose one)</td>
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<tr>
<td>ANSC 441</td>
<td>Human Genetics</td>
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<td>ANSC 444</td>
<td>Applied Animal Genetics</td>
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<td>ANSC 446</td>
<td>Population Genetics</td>
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<tr>
<td>BIOP 401</td>
<td>Introduction to Biophysics</td>
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<td>BIOP 550</td>
<td>Biomolecular Physics</td>
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<tr>
<td>CPSC 452</td>
<td>Advanced Plant Genetics</td>
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<td>CPSC 466</td>
<td>Genomics for Plant Improvement</td>
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<tr>
<td>CPSC 554</td>
<td>Quantitative Genetics and Genomics</td>
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<tr>
<td>CPSC 563</td>
<td>Chromosomes</td>
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<td>CPSC 566</td>
<td>Plant Gene Regulation</td>
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<td>MCB 400</td>
<td>Cancer Cell Biology</td>
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<td>MCB 450</td>
<td>Introductory Biochemistry</td>
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<td>MCB 501</td>
<td>Advanced Biochemistry</td>
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<tr>
<td>MCB 502</td>
<td>Advanced Molecular and Cell Biology</td>
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Choose One (1) course from each of the following areas:

### Data Stewardship
- IS 455  Database Design and Prototyping
- IS 515  Information Modeling
- IS 537  Theory & Practice of Data Cleaning
- IS 543  Digital Preservation
- IS 547  Foundations of Data Curation
- IS 575  Metadata in Theory & Practice

### Data Analytics
- IS 407  Introduction to Data Science
- IS 445  Data Visualization
- IS 507  Data, Statistical Models and Information
- IS 527  Network Analysis
- IS 557  Applied Machine Learning: Team Projects
- IS 567  Text Mining
- IS 577  Data Mining

### System Policy & Design
- IS 419  Entrepreneurial Information Technology Design
- IS 445  Data Visualization
- IS 504  Sociotechnical Information Systems
- IS 584  Advanced Topics in Ethics and Privacy (Privacy in the Internet Age)
- IS 586  Usability Engineering
- IS 594  Advanced Topics in Management and Policy (Information Policy)

### Electives
- IS 424  Social Computing
- IS 464  Information Assurance
- IS 517  Methods of Data Science
- IS 571  Advanced Topics in Use and Users of Information (Info Services for Diverse Users)
- INFO 591  Grad Bioinformatics Seminar

For Thesis Option up to 8 hours:
- IS 599  Thesis Research

**Total Hours**

**36**

**Other Requirements**

1. Students will be able to describe the essential concepts in data stewardship, data analytics and systems analysis and policy and the ways in which those concepts impact bioinformatics.
2. Students will demonstrate the ability to read, analyze, discuss, and critique scientific advances and limitations described in the research literature.
3. Students will execute a research project that includes their articulation of a tractable research question that is addressed and analyzed using the appropriate scientific methods.

4. Students will effectively and accurately communicate to an interdisciplinary audience in both oral and written formats.

5. Students will adhere to the highest level of ethical standards in all stages of their research and professional activities.

Graduate Degree Programs in the School of Information Science

- Degree Programs
  - Bioinformatics: Information Sciences, MS (p. 1) (on campus & online)
  - Information Management, MS (http://catalog.illinois.edu/graduate/is/information-management-ms/) (on campus & online)
  - Library & Information Science, MS (http://catalog.illinois.edu/graduate/is/library-information-science-ms/) (on campus & online)
  - Library & Information Science, CAS (http://catalog.illinois.edu/graduate/is/library-information-science-cas/) (on campus & online)
  - Information Sciences, PhD (http://catalog.illinois.edu/graduate/is/information-science-phd/)

- Concentration:
  - Writing Studies (http://catalog.illinois.edu/graduate/las/concentration/writing-studies/)

- Joint Degree Programs:
  - Library & Information Science, MS and African Studies, MA (http://catalog.illinois.edu/graduate/is_las/joint-degree/african-studies-ma-library-information-science-ms/)
  - Library & Information Science, MS and History, MA (http://catalog.illinois.edu/graduate/is_las/history-ma-library-information-science-ms/)
  - Library & Information Science, MS and Russian, East European, & Eurasian Studies, MA (http://catalog.illinois.edu/graduate/is_las/joint-degree/african-studies-ma-library-information-science-ms/)

School Librarian Licensure: available in conjunction with both the MS in LIS and CAS in LIS

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School of Information Sciences
Dean: Eunice Santos
Program contact: Katrina Hagler
School of Information Sciences website (https://ischool.illinois.edu/)
iSchool Faculty (https://ischool.illinois.edu/people/faculty/)
501 East Daniel Street, Champaign, IL 61820-6211
(217) 244-3432, (800) 982-0914 (within the US)
ischool email (ischool-apply@illinois.edu)

Overview of MS in Bioinformatics requirements (https://ischool.illinois.edu/degrees-programs/ms-bioinformatics/apply/)

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