

BIOINFORMATICS: CROP SCIENCES, MS

for the Master of Science in Bioinformatics, Crop Sciences Concentration

The genomic and proteomic projects are generating large amounts of complex biological data that require effective storage, retrieval, analysis and interpretation. The bioinformatics degree program provides students with the skills necessary to augment the understanding and use of agricultural, biological and medical information and resources through the application of molecular, chemical, physical, computational, statistical, mathematical and informatic techniques. Students interested in this program may come with undergraduate training in one of the following areas:

1. biological and agricultural sciences,
2. statistical, mathematical and computer sciences,
3. informatics and engineering sciences.

Graduates from the bioinformatics program will be able to integrate basic and applied concepts in the three areas and apply them to biotechnology and medical research. For additional information, please see our website (<https://croppsciences.illinois.edu/academics/graduate-degrees/master-science-bioinformatics/>).

Admission

Applicants are considered for admission to the Master of Science program if they have a bachelor's or equivalent degree comparable to that granted by the University of Illinois. Strong letters of reference, evident motivation to undertake graduate study, and good preparation in basic science courses enhance an applicant's credentials. For some programs, greater emphasis is given to previous training in plant sciences, chemistry, or mathematics. A grade point average equivalent to at least a B in the last 60 semester hours of undergraduate course work plus any graduate level work completed is required. All applicants whose native language is not English are required to submit the results of the TOEFL or IELTS as evidence of English proficiency. Official scores are required to be submitted directly from TOEFL/ETS or IELTS to the University. Additional information for international applicants can be found online (<https://grad.illinois.edu/admissions/apply/begin/international/>). Please see our website for additional information (<https://croppsciences.illinois.edu/graduate/admissions/>). (<https://croppsciences.illinois.edu/academics/graduate-degrees/master-science-bioinformatics/>)

Graduate Teaching Experience

Experience in teaching is considered an important part of the graduate experience in this program.

Faculty Research Interests

Please refer to the following webpage for a detailed listing of our faculty and their areas of interest (<https://croppsciences.illinois.edu/people/faculty/>).

Financial Aid

Fellowships and assistantships are available to outstanding students on a competitive basis. Awards for financial assistance are based principally on a candidate's academic record, statement of plans, and letters of reference.

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The Crop Sciences concentration within the M.S. degree in Bioinformatics can be earned with a thesis option or a non-thesis option, which requires optional supervised research experiences.

For additional details and requirements refer to the department's graduate handbook (<https://croppsciences.illinois.edu/academics/graduate-degrees/graduate-handbook/>) and the Graduate College Handbook (<http://www.grad.illinois.edu/gradhandbook/>).

Thesis Option

Code	Title	Hours
Biology (choose one)		4
ANSC 441	Human Genetics	
ANSC 444	Applied Animal Genetics	
ANSC 446	Population Genetics	
BIOP 401	Introduction to Biophysics	
BIOP 550	Biomolecular Physics	
CPSC 452	Advanced Plant Genetics	
CPSC 466	Genomics for Plant Improvement	
CPSC 554	Quantitative Genetics and Genomics	
CPSC 563	Chromosomes	
CPSC 566	Plant Gene Regulation	
MCB 400	Cancer Cell Biology	
MCB 450	Introductory Biochemistry	
MCB 501	Advanced Biochemistry	
MCB 502	Advanced Molecular and Cell Biology	
Fundamental Bioinformatics (choose one)		4
ANSC 542	Applied Bioinformatics	
ANSC 545	Statistical Genomics	
CHBE 571	Bioinformatics	
CPSC 567	Bioinformatics & Systems Biol	
CS 466	Introduction to Bioinformatics	
IB 467	Principles of Systematics	
MCB 432	Computing in Molecular Biology	
Computer Science and Informatics (choose one)		4
CS 411	Database Systems	
CS 466	Introduction to Bioinformatics	
CS 473	Algorithms	
CPSC 565	Perl & UNIX for Bioinformatics	
IS 455	Database Design and Prototyping	
IS 507	Data, Statistical Models and Information	
STAT 428	Statistical Computing	
STAT 440	Statistical Data Management	
STAT 448	Advanced Data Analysis	
STAT 480	Big Data Analytics	
STAT 525	Topics in Computational Statistics	
Seminar (1 per semester)		
Electives		16
CPSC 599 or PLPA 599	Thesis Research	4
Total Hours		32

Other Requirements

Code	Title	Hours
Other requirements and conditions may overlap		
A concentration is required		
Minimum Hours Required Within the Unit:		5
Minimum 500-level Hours Required overall:		12
Minimum GPA:		3.0

Non-Thesis Option

Code	Title	Hours	
Biology (choose one)			
ANSC 441	Human Genetics	4	
ANSC 444	Applied Animal Genetics		
ANSC 446	Population Genetics		
BIOP 401	Introduction to Biophysics		
BIOP 550	Biomolecular Physics		
CPSC 452	Advanced Plant Genetics		
CPSC 466	Genomics for Plant Improvement		
CPSC 554	Quantitative Genetics and Genomics		
CPSC 563	Chromosomes		
CPSC 566	Plant Gene Regulation		
MCB 400	Cancer Cell Biology		
MCB 450	Introductory Biochemistry		
MCB 501	Advanced Biochemistry		
MCB 502	Advanced Molecular and Cell Biology		
Fundamental Bioinformatics (choose one)			
ANSC 542	Applied Bioinformatics	4	
ANSC 545	Statistical Genomics		
CHBE 571	Bioinformatics		
CPSC 567	Bioinformatics & Systems Biol		
CS 466	Introduction to Bioinformatics		
IB 467	Principles of Systematics		
MCB 432	Computing in Molecular Biology		
Computer Science and Informatics (choose one)			
CS 411	Database Systems		4
CS 466	Introduction to Bioinformatics		
CS 473	Algorithms		
CPSC 565	Perl & UNIX for Bioinformatics		
IS 455	Database Design and Prototyping		
IS 507	Data, Statistical Models and Information		
STAT 428	Statistical Computing		
STAT 440	Statistical Data Management		
STAT 448	Advanced Data Analysis		
STAT 480	Big Data Analytics		
STAT 525	Topics in Computational Statistics		
Seminar (1 per semester)			
Electives		24	
Total Hours		36	

Other Requirements

Code	Title	Hours
Other requirements and conditions may overlap		
A concentration is required		

Minimum Hours Required Within the Unit:	5
Minimum 500-level Hours Required overall:	12
Minimum GPA:	3.0

for the Master of Science in Bioinformatics, Crop Sciences Concentration

Thesis

1. Students will be able to read, understand, knowledgeably discuss and summarize in writing the primary scientific literature of their particular disciplinary research area (bioinformatics and statistics, crop genetic improvement, crop production, plant protection, sustainable food systems, and water quality and environmental systems).
2. Students will assume responsibility and ownership in research project development and execution.
3. Students will acquire professional scientific writing and communication skills.
4. Students will develop the capacity to communicate and collaborate across interdisciplinary boundaries.
5. Students will develop the interpersonal skills to be competitive for career opportunities in plant sciences and agriculture.

Non-Thesis

1. Students will be able to read, understand, knowledgeably discuss and summarize in writing the primary scientific literature of their particular disciplinary research area (bioinformatics and statistics, crop genetic improvement, crop production, plant protection, sustainable food systems, and water quality and environmental systems).
2. Students will acquire professional scientific writing and communication skills.
3. Students will develop the capacity to communicate and collaborate across interdisciplinary boundaries.
4. Students will develop the interpersonal skills to be competitive for career opportunities in plant sciences and agriculture.

Graduate Degree Programs in Crop Sciences

- Crop Sciences, MS (<http://catalog.illinois.edu/graduate/aces/crop-sciences-ms/>) (on campus & online)
- Bioinformatics: Crop Sciences, MS (p. 1)
- Crop Sciences, PhD (<http://catalog.illinois.edu/graduate/aces/crop-sciences-phd/>)

for the Master of Science in Bioinformatics, Crop Sciences Concentration

Department of Crop Sciences

Head of Department: Adam Davis

Advisor: Nathan Schroeder

Crop Sciences website (<https://cropsciences.illinois.edu/>)

AW-101 Turner Hall, 1102 South Goodwin Avenue, Urbana, IL 61801
(217) 244-0396

Crop Sciences Graduate email (grad@cropsciences.illinois.edu)

College of Agricultural, Consumer & Environmental Sciences (ACES)

College of Agricultural, Consumer & Environmental Sciences website (<http://catalog.illinois.edu/schools/aces/>)

Admissions

Graduate College Admissions & Requirements (<https://grad.illinois.edu/admissions/apply/>)