BIOINFORMATICS (MS)

NON-THESIS

Students gain real-world experience in an internship environment and are exposed to a breadth of course work in the field. Students will be able to pursue employment (e.g.in the biotech industry, research institutions, and government agencies), or further advanced degrees (e.g. PhD or MD).

THESIS

Students are trained in conducting hypothesis-driven independent research including experimental design, analysis and interpretation of results, as well as scientific writing and presentation. At the conclusion of their studies, students are primed for research positions in the private and public sector and competitive PhD programs.

CURRICULUM

Degree Requirements

Students pursuing the Master of Science in Bioinformatics must complete 30 credit hours. Six (6) courses worth a total of 17 credit hours make up the Core Curriculum requirements, and students select a *Non-Thesis* or *Thesis* track to complete the remaining 13 credit hours required.

Code	Title	Hours
Core Curriculum		
BIOL 488	Bioinformatics	3
COMP 483	Computational Biology	4
STAT 437	Quantitative Bioinformatics	3
BIOI 500	Advanced Bioinformatics	3
BIOI 501	Bioinformatics Seminar	1
Select one of the following:		*3*
BIOI 565	Exploring Proteins	
CHEM 465	Special Topics in Biochemistry (Proteomics)	
Track Requirements (see below)		**13**
Total Hours		**30**

Non-Thesis Track

Master of Science in Bioinformatics students in the Non-thesis track complete a Bioinformatics Internship and four (4) approved electives.

Code	Title	Hours
BIOI 498	Bioinformatics Internship [1]	1
Select four from the following		*12*
BIOL 402	Microbiology	
BIOL 482	Advanced Molec Genetics	
BIOL 495	Special Topics (Genomics; Infectious Diseases;Metagenomics)	
CHEM 423	Medicinal Chemistry	
CHEM 465	Special Topics in Biochemistry (Advanced Enzyme Kinetics and Mechanisms; Plant Biochemistry)	
COMP 406	Data Mining	
COMP 413	Intermediate Object-Oriented Development	
COMP 439	Distributed Systems	
COMP 453	Database Programming	
COMP 460	Algorithms & Complexity	
COMP 471	Theory of Programming Languages	
COMP 479	Machine Learning	
COMP 488	Computer Science Topics (Introduction to Natural Language Processing)	
STAT 406	Stochastic Processes	
STAT 407	Statistical Design	
STAT 408	Applied Regression Analysis	
STAT 410	Categorical Data Analysis	
STAT 421	Math Modeling & Simulation	
STAT 488	Topics in Statistics (Biostatistics)	
Total Hours		**13**

Thesis Track

Master of Science in Bioinformatics students in the Thesis track complete one (1) approved electives as well as design and conduct thesis research under direction of faculty.

Code	Title	Hours
BIOI 494	Bioinformatics Research Design	1
BIOI 499	Bioinformatics Research	8
BIOI 595	Thesis Supervision	1
Select one of the following:		**3**
BIOL 402	Microbiology	
BIOL 482	Advanced Molec Genetics	
BIOL 495	Special Topics (Genomics; Infectious Diseases; Metagenomics)	
CHEM 423	Medicinal Chemistry	
CHEM 465	Special Topics in Biochemistry (Advanced Enzyme Kinetics and Mechanisms; Plant Biochemistry)	
COMP 406	Data Mining	
COMP 413	Intermediate Object-Oriented Development	
COMP 439	Distributed Systems	
COMP 453	Database Programming	
COMP 460	Algorithms & Complexity	
COMP 471	Theory of Programming Languages	
COMP 479	Machine Learning	
COMP 488	Computer Science Topics (Introduction to Natural Language Processing)	
STAT 406	Stochastic Processes	
STAT 407	Statistical Design	
STAT 408	Applied Regression Analysis	
STAT 410	Categorical Data Analysis	
STAT 421	Math Modeling & Simulation	
STAT 488	Topics in Statistics (Topics in Biostatistics)	
Total Hours		**13**

All PhD students and students in thesis-based Master's degree programs must successfully complete UNIV 370 Responsible Conduct in Research and Scholarship or other approved coursework in responsible conduct of research as part of the degree requirements. It is strongly recommended that students complete this two-day training before beginning the dissertation/thesis stage of the program.

Graduate & Professional Standards and Regulations

Students in graduate and professional programs can find their Academic Policies in Graduate and Professional Academic Standards and Regulations (https://catalog.luc.edu/graduate-professional-academic-standards-regulations/) under their school. Any additional University Policies supercede school policies.

LEARNING OUTCOMES

In Loyola's M.S. in Bioinformatics program you will gain fundamental skills that will help you be an inquisitive scientist.

- a solid foundation in biological, computational, chemical, and statistical concepts and theory;
- the facility to interpret primary scientific literature;
- the capacity to employ statistical and computational methods to investigate and solve problems within the life sciences;
- the ability to conduct bioinformatics study in industry and/or the research environment; and
- science-related oral and written communication skills.