BIOINFORMATICS - MASTER OF SCIENCE

The degree requirements include 30-31 graduate credit hours. The degree has **two tracks**, one for students with non-computing background and another for students with Computer Science background. The requirements for each track are structured as follows.

Track: Non-Computing Background

Prefix	Title	Credits
Required Courses		
Core Courses		
BIOL 550	Special Topics (Command Line Bioinformatics)	3
A ST 505	Statistical Inference I	4
C S 453	Python Programming I	3
BIOL 550	Special Topics (R for ecological sciences)	3
or C S 458	R Programming I	
C S 509	Bioinformatics Programming	3
C S 508	Introduction to Data Mining	3
or C S 519	Applied Machine Learning I	
Elective Courses (2 from the following list)		6
C S 462	Object Oriented Programming Transition	
C S 516	Bioinformatics	
C S 586	Algorithms in Systems Biology	
GENE 452	Applied Bioinformatics	
or BIOL 566	Advanced Bioinformatics and NCBI Database	
A ST 550	Special Topics (Statistical bioinformatics course)	
A ST 550	Special Topics (Current topics in bioinformatics - open issues)	
Master's Project/Thesis/Internship [1]		6
C S 598	Master's Project	
or C S 599	Master's Thesis	
Total Credits		**31**

[1] A student can write a thesis (C S 599 Master's Thesis), undertake a research project (C S 598 Master's Project), or participate in an internship related to the degree. In each case, six graduate credits are required and a written approval from the student's advisor must be obtained before the student undertakes this part of the study. For students with thesis or project, the students are required to sustain a final exam, covering the thesis/research project.

[2] One course to cover prerequisites to enter GENE 315 Molecular Genetics and BCHE 341 Survey of Biochemistry is required.

Track: Computer Science Background

Prefix	Title	Credits
Required Courses [2]		
C S 508	Introduction to Data Mining	3
C S 509	Bioinformatics Programming	3
C S 570	Analysis of Algorithms	3
C S 586	Algorithms in Systems Biology	3
C S 581	Advanced Software Engineering	3
Select one from the following:		3
C S 516	Bioinformatics	
GENE 452	Applied Bioinformatics	
BIOL 566	Advanced Bioinformatics and NCBI Database	
Elective Courses (2 from the following list)		6
A ST 505	Statistical Inference I	
A ST 506	Statistical Inference II	
BCHE 546	Biochemistry II	
BCHE 649	Topics in Biochemistry	
BIOL 474	Immunology	
BIOL 475	Virology	
BIOL 478	Molecular Biology of Microorganisms	
BIOL 490	Neurobiology	
BIOL 520	Molecular Cell Biology	
BIOL 566	Advanced Bioinformatics and NCBI Database	
C S 502	Database Management Systems I	
C S 505	Artificial Intelligence I	
C S 516	Bioinformatics	
C S 521	Parallel Programming	
C S 575	Artificial Intelligence II	
C S 582	Database Management Systems II	
GENE 452	Applied Bioinformatics	
GENE 486	Genes and Genomes	
MOLB 542	Biochemistry I	
MOLB 546	Biochemistry II	
MOLB 590	Discussions in Molecular Biology	
Master Thesis/Project/Internship [1]		6
C S 599	Master's Thesis	
or C S 598	Master's Project	
Total Credits		
Total Credits		**30**

[1] A student can write a thesis (C S 599 Master's Thesis), undertake a research project (C S 598 Master's Project), or participate in an internship related to the degree. In each case, six graduate credits are required and a written approval from the student's advisor must be obtained before the student undertakes this part of the study. For students with thesis or project, the students are required to sustain a final exam, covering the thesis/research project.

[2] One course to cover prerequisites to enter GENE 315 Molecular Genetics and BCHE 341 Survey of Biochemistry is required.