

# BIOINFORMATICS - MINOR

In the early 21st century we have gained the ability to decipher and manipulate the genetic information of organisms. We have also seen dramatic advances in imaging technologies from the macro to nano scales (Satellites/UAVs, hyper-spectral imaging, GPS, MRI, confocal and two photon microscopy, x-ray crystallography, etc.). Concomitant with, and underlying these advances, has been a revolution in information technology in which we have seen ever accelerating computational processing speeds and ever more massive data sets. These changes are driving a fundamental transformation of the biological sciences. In order to provide our students with the educational foundation they need to not just flourish, but to lead in this dramatically altered environment, we are offering a minor in the area of Bioinformatics to provide effective training at the interface of biological applications and computational tools. While students will be trained using the most advanced tools and applications available, the minor will focus on core concepts and approaches, to provide a durable skill set that can be applied to new tools and applications that will inevitably develop. The core curriculum of the minor will cover the essentials of effective computation, as well as the handling, exploration and utilization of large data sets.

Minimum of 16 hours required.

Minimum of 6 hours at the 300- to 400-level.

Must make a grade of C or better in all required Bioinformatics minor courses.

Students must complete at least one course in each of the five categories. If a course in statistics is not already required for a student's major, then STAT 211, STAT 301, STAT 302, or STAT 303 is strongly recommended. Independent research experiences through 491 courses is encouraged.

## Program Requirements

Code	Title	Semester Credit Hours
<b>Required Courses</b>		
Introduction to Computation		4
CSC 110	Programming I	
	or CSC 110r Introduction to Computer Science Concepts and Programming	
Bioinformatic Fundamentals		3
BIOL 451	Bioinformatics	
Computational Bioinformatics		3
BIOL 350	Computational Genomics	
<b>Upper Level Biology</b>		
Biological Molecules and Processes		3-4
Select one of the following:		
BIOL 213	Molecular Cell Biology	
GENE 302	Principles of Genetics	
GENE 320/	Biomedical Genetics	
BIMS 320		
Applied Bioinformatics		3-4
Select one of the following:		
BICH 419/	Computational Techniques for	
GENE 419	Evolutionary Analysis	
BICH 464/	Bacteriophage Genomics	
GENE 464		
BIOL 430	Biological Imaging	
BIOL 450/	Genomics	
BICH 450		
STAT 446	Statistical Bioinformatics	
VTPP 438	Analysis of Genomic Signals	
<b>Total Semester Credit Hours</b>		<b>16</b>