

# INFORMATICS COGNATE: BIOINFORMATICS

## BS in Informatics

An informatics major with a bioinformatics cognate requires a minimum of 55 semester hours, with at least 27 semester hours drawn primarily from courses in Chemistry and Biological Sciences. This major is intended for students interested in applications of computing to the biological sciences. Study in this area may lead students to careers in laboratory research, data management, and/or graduate programs in bioinformatics or genetics.

The biological sciences cognate consists of 27 to 31 semester hours of cognate coursework (a total of 55 to 59 s.h.), and provides considerable flexibility to accommodate a student's specific interests. All students in this cognate take the same introductory coursework in chemistry and the biological sciences (16 semester hours), followed by 11 to 15 additional semester hours selected from any one of the three following menus, depending on interest. Moreover, students in this cognate should elect to take 22S:101 as their introductory statistics course (see courses in the Informatics Core).

The introductory chemistry sequence consists of 8 semester hours. (Note: This is the strongly recommended chemistry preparation. Students who have already completed other chemistry preparation, or wish to take a different sequence, may meet with an Informatics advisor to discuss alternatives for meeting this requirement.)

004:011 Principles of Chemistry I	4 s.h.	<i>and</i>
004:012 Principles of Chemistry II	4 s.h.	
TOTAL	8 s.h.	

Note: Although the General Chemistry course sequence does not usually meet the prerequisite specifications for some other required courses (e.g., 002:010), this requirement may not be strictly enforced for students who are not intending to pursue a pure biology major or admission to medical school. For now, check with the Biological Sciences Department to be certain.

The introductory biological sciences sequence consists of 8 semester hours of coursework.

002:010 Principles of Biology I	4 s.h.	<i>and</i>
002:011 Principles of Biology II	4 s.h.	
TOTAL	8 s.h.	

Students interested primarily in genome bioinformatics must take 002:128 Fundamental Genetics and 002:131 Evolution, followed by two additional courses in the following list, totaling 13-14 s.h.

002:128 Fundamental Genetics	4 s.h.	<i>and</i>
002:131 Evolution	4 s.h.	<i>and</i>
002:170 Bioinformatics	3 s.h.	<i>and/or</i>
002:174 Computational Genomics	3 s.h.	<i>and/or</i>
002:176 Microarray Analysis and Statistical Bioinformatics	3 s.h.	
TOTAL	14 s.h.	

Students interested in phylogenetics and evolution must take 002:128 Fundamental Genetics and 002:131 Evolution followed by two additional courses in the following list, totaling 13-15 s.h.

002:128 Fundamental Genetics	4 s.h.	<i>and</i>
002:131 Evolution	4 s.h.	<i>and</i>
002:134 Ecology	4 s.h.	<i>and/or</i>
002:160 Molecular Phylogenetics	3 s.h.	<i>and/or</i>
002:162 Population Genetics and Molecular Evolution	3 s.h.	
TOTAL	14-15 s.h.	

Students interested primarily in proteomics will take the following four courses, for a total of 12 semester hours.

004:121 Organic Chemistry I	3 s.h.	<i>and</i>
002:133 Cell Biology Laboratory	3 s.h.	<i>and</i>
099:120 Biochemistry and Molecular Biology	3 s.h.	<i>and</i>
099:241 Biophysical Chemistry I	3 s.h.	
TOTAL	12 s.h.	

Students primarily interested in systems biology should select courses according to the following table, for a total of 11-12 semester hours.

004:121 Organic Chemistry I	3 s.h.	<i>and</i>
061:157 General Microbiology	5 s.h.	<i>and</i>
002:110 Plant Physiology	3-4 s.h.	<i>or</i>
002:124 Animal Physiology	3 s.h.	<i>or</i>
061:147 Survey of Immunology	4 s.h.	<i>or</i>
061:160 Microbial Physiology	3 s.h.	<i>or</i>
061:170 Microbial Genetics	3 s.h.	
TOTAL	11-12 s.h.	

**Note: students are encouraged to work with an Informatics faculty advisor to develop and get approval for personalized cognate course sets. We expect to expand and refine this cognate's course set based on student goals and creation of new informatics-related cognate courses.**