

Minor in Bioinformatics and Computational Biology

36-37 credits
(updated Jun 2014, IE)

Course	Name	Pre-requirement	Credits	Offered	Taken	Grade
Biology			15			
BIOL 141	Foundations of Biology I	MATH 150 [†]	4	FSZ		
BIOL 142	Foundations of Biology II	MATH 150 [†] , BIOL 141	4	FSZ		
BIOL 313	Introduction to Bioinformatics	MATH 151, BIOL 141 or CMSC 104 [*]	3	S		
BIOL 495	Seminar in Bioinformatics	BIOL 142, 313; CMSC 202 ^[CR]	4	S		
Statistics			4			
STAT 355	Stats w/Applications in Bio Sci	MATH 151, 152	4	FS		
Computer Sciences			14			
CMSC 201 ^{**}	Computer Science I for Majors	MATH 150 [†]	4	FS		
CMSC 202	Computer Science II for Majors	CMSC 201; MATH 150	4	FS		
CMSC 203	Discrete Structures	CMSC 201 ^[CR] ; MATH 151	3	FSZ		
CMSC 341	Data Structures	CMSC 202, 203	3	FS		
Elective			4			
CMSC/BIOL/STAT/CHEM	(see List)	(see Catalog)	3-4			
Total			36-37			

- All required courses must be completed with a grade of C or better
- All courses taken as pre-requisites for other courses must be passed with a C or better
- Courses taken on a P/F basis will not count towards the minor
- A simple majority of the courses for the minor must be completed in residence at UMBC
- The elective course cannot be used to meet major requirements

Semester Legend: F=Fall, S=Spring, Z=Possible Summer (For indicative purposes only. Please check online course availability)

[†] MATH 150 or higher or placement in MATH151

^[CR] Co-Requirement

⁺ Requires previous programming experience or CMSC 104.

^{*} CMSC 201 or equivalent can be used, instead of CMSC 104, to meet the pre-requirement.

^{**} The sequence IS 147 + IS 247 can be used in place of CMSC 201 to satisfy the prerequisite for CMSC 202 and the co-requisite for CMSC 203 by Information System (IS) majors.

Approved Bioinformatics & Computational Biology Minor Electives

Approved BIOL electives

BIOL 411 - Bacterial Physiology
 BIOL 414 - Eukaryotic Gen. & Mol. Biology
 BIOL 418 - Human Molecular Biology
 BIOL 420 - Advanced Topics in Cell Biology
 BIOL 426 - Approaches to Molecular Biology
 BIOL 428 - Computer Appl. in Mol. Biology
 BIOL 430 - Biological Chemistry
 BIOL 434 - Microbial Molecular Genetics
 BIOL 442 - Developmental Biology
 BIOL 444 - Development and Cancer
 BIOL 445 - Signal Transduction
 BIOL 466 - Population and Quant. Genetics
 BIOL 483 - Evolution: Genes to Genomes
 BIOL 486 - Genome Science

For non-BIOL/BIOC majors also:

BIOL 302 - Molecular & General Genetics
 BIOL 303 - Cell Biology
 BIOL 304 - Plant Biology

BIOL 305 - Comparative Animal Physiology

Approved MATH/STAT electives

STAT 419 - Introduction to Biostatistics
 STAT 420 - Statistics for Bioinformatics
 STAT 432 - Stat. Comp. Packages and Applications
 STAT 433 - Statistical Computing
 STAT 451 - Introduction to Probability Theory
 STAT 453 - Introduction to Mathematical Statistics
 STAT 454 - Applied Statistics
 STAT 614 - Environmental Statistics

For non-MATH/STAT majors also:

MATH 301 - Intro. to Mathematical Analysis I
 MATH 302 - Intro. to Mathematical Analysis II
 MATH 341 - Computational Methods

Approved CMSC electives

CMSC433 - Scripting Languages
 CMSC436 - Data Visualization
 CMSC437 - Graphical User Interface Programming

CMSC441 - Design and Analysis of Algorithms
 CMSC446 - Introduction to Design Patterns
 CMSC461 - Database Management Systems
 CMSC471 - Introduction to Artificial Intelligence
 CMSC476 - Information Retrieval
 CMSC478 - Introduction to Machine Learning

Approved CHEM electives

CHEM 420 - Comp. Appl. in Chem.
 CHEM 431 - Chemistry of Proteins
 CHEM 432 - Advanced Biochemistry
 CHEM 433 - Biochemistry of Nucleic Acids
 CHEM 437 - Comprehensive Biochemistry I
 CHEM 438 - Comprehensive Biochemistry II
 CHEM 444 - Molecular Modeling in Biochemistry

For non-CHEM majors also:

CHEM 301 - Physical Chemistry
 CHEM 303 - Physical Chemistry for the Biochem.
 CHEM 352 - Organic Chemistry II