Minor in Bioinformatics and Computational Biology

36-37 credits
(updated October 2021, NZD)

Course	Name	Pre-requirement	Credits	Offered	Taken	Grade
Biology			15			
BIOL 141	Foundations of Biology I	MAT150[†]	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 302, BIOL 303, CMSC 201[††]	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, CNMS 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

[††] The BIOL 302/303 course pre-requisites for BIOL 495 can be waived for BINF minors. Contact the BINF program director or the BIOL 495 course instructor for more information.

[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