BIOLOGY COMPREHENSIVE MAJOR: PRE-MEDICINE/CELL AND MOLECULAR BIOLOGY EMPHASIS

Program Requirements

The Pre-Medicine/Cell and Molecular Biology Emphasis requires a minimum of 67 credits, including the 26-credit Biology Nucleus, 19 additional credits in Biology and/or Chemistry, and 22 credits of supporting courses:

All Biology majors require the 26-credit Biology Nucleus.

Code	Title	Credits
Biology Nucleus		
BIOL 150	Biological Principles (with laboratory) (GT-SC1)	4
BIOL 151	Diversity and Patterns of Life (with laboratory)	4
BIOL 301	General Ecology	3
BIOL 310	Cell Biology	3
BIOL 312	Genetics (with recitation)	4
CHEM 111	General Chemistry I (GT-SC2)	3
CHEM 112	General Chemistry Laboratory I (GT-SC1)	1
CHEM 113	General Chemistry II	3
CHEM 114	General Chemistry Laboratory II	1
Total Credits		**26**

Code	Title	Credits
Required Biology and Chemistry courses		
BIOL 313	Cell and Genetics Laboratory	2
Fifteen credits of the following:		15
BIOL 317	Genome Analysis (with laboratory)	
BIOL 342	Microbiology (with laboratory)	
BIOL 373	Human Anatomy and Physiology II (with laboratory)	
BIOL 420	Molecular Biology (with laboratory)	
BIOL 454	Developmental Biology (with laboratory)	
BIOL 474	Comparative Animal Physiology (with laboratory)	
CHEM 472	Biochemistry II	
CHEM 474	Biochemistry Laboratory	
Select at least two credits of Capstone Experience Courses:		2
BIOL 495	Senior Seminar (may be repeated)	
BIOL 496	Senior Thesis	
Total Credits		**19**

Code	Title	Credits
Minimum Supporting Courses		
CHEM 331	Organic Chemistry I	3
CHEM 332	Organic Chemistry II	3
CHEM 334	Organic Chemistry Laboratory I	1
CHEM 335	Organic Chemistry Laboratory II	1
CHEM 471	Biochemistry I	3
One of the following:		3-4
MATH 151	Calculus I (GT-MA1)	
MATH 213	Probability and Statistics (GT-MA1)	
Select one of the following pairs of courses:		8
PHYS 170 & PHYS 185	Principles of Physics I (GT-SC2) and Laboratory Physics I (GT-SC1)	
AND		
PHYS 171 & PHYS 186	Principles of Physics II (GT-SC2) and Laboratory Physics II (GT-SC1)	
OR		
PHYS 190 & PHYS 185	General Physics I (GT-SC2) and Laboratory Physics I (GT-SC1)	
AND		
PHYS 191 & PHYS 186	General Physics II (GT-SC2) and Laboratory Physics II (GT-SC1)	
Total Credits		**22-23**

Capstone Course Requirement

The following courses in the Biology Major fulfill the capstone course requirement: BIOL 495 SENIOR SEMINAR, BIOL 496 Senior Thesis or EDUC 409 SECONDARY STUDENT TEACHING.

Graduation Requirements

Undergraduate programs require a minimum of 120 semester credits for graduation. Of those 120 credits, 40 credits must be in upper-division courses (those marked 300 and above). Fifteen of these 40 upper-division credits must be earned in courses that are part of the standard or comprehensive major program being pursued.

Students are expected to review all graduation requirements, which can be found in the Western Undergraduate Catalog: Graduation Requirements (https://catalog.western.edu/undergraduate/graduation-requirements/).

Course	Title	Credits
Year One		
Fall		
BIOL 150	Biological Principles (with laboratory) (GT-SC1)	4
CHEM 111	General Chemistry I (GT-SC2)	3
CHEM 112	General Chemistry Laboratory I (GT-SC1)	1
ENG 102	Writing and Rhetoric I (GT-CO1)	3
HWTR 100	First Year Seminar	1
MATH 140	College Algebra (GT-MA1)	3
	Credits	**15**
Spring		
BIOL 151	Diversity and Patterns of Life (with laboratory)	4
ENG 103	Writing and Rhetoric II (GT-CO2)	3
CHEM 113	General Chemistry II	3
CHEM 114	General Chemistry Laboratory II	1
MATH 141	Precalculus (GT-MA1)	4
	Credits	**15**
Year Two		
Fall		
BIOL 310	Cell Biology	3
BIOL 301	General Ecology	3
CHEM 331	Organic Chemistry I	3
CHEM 334	Organic Chemistry Laboratory I	1
MATH 151 or MATH 213	Calculus I (GT-MA1) or Probability and Statistics (GT-MA1)	3-4

Arts & Humanities GE		3
	Credits	**16-17**
Spring		
CHEM 332	Organic Chemistry II	3
CHEM 335	Organic Chemistry Laboratory II	1
BIOL 312	Genetics (with recitation)	4
BIOL 313	Cell and Genetics Laboratory	2
Social Science GE		3
Arts & Humanities GE		3
	Credits	**16**
Year Three		
Fall		
CHEM 471	Biochemistry I	3
Social Science GE		3
Biology Elective		4
PHYS 170 or PHYS 190	Principles of Physics I (GT-SC2) or General Physics I (GT-SC2)	3
PHYS 185	Laboratory Physics I (GT-SC1)	1
	Credits	**14**
Spring		
PHYS 171 or PHYS 191	Principles of Physics II (GT-SC2) or General Physics II (GT-SC2)	3
PHYS 186	Laboratory Physics II (GT-SC1)	1
Biology Elective		4
Social Science GE		3
Arts & Humanities GE		3
	Credits	**14**
Year Four		
Fall		
BIOL 495 or BIOL 496	Senior Seminar or Senior Thesis	2
Biology Elective		4
Elective	Elective	11
	Credits	**17**
Spring		
Biology Elective		3
Elective	Elective	9
	Credits	**12**
	Total Credits	**119-120**