

CELLULAR/MOLECULAR BIOLOGY CONCENTRATION, BACHELOR OF SCIENCE - CELL

Major Requirements (60 hours)

Thirty-seven (37) hours must be in biology.

Code	Title	Credits
Required		
BIO 155 & 155L	Foundations of Molecular Biology and Foundations of Molecular Biology Laboratory	2
BIO 156 & 156L	Foundations of Ecology and Evolution and Foundations of Ecology and Evolution Laboratory (I)	2
BIO 157 & 157L	Foundations of Cellular Biology and Foundations of Cellular Biology Laboratory	2
BIO 158 & 158L	Foundations of Form and Function and Foundations of Cellular Biology Laboratory	2
BIO 221 & 221L	Introduction to Genetics and Introduction to Genetics Laboratory	4
BIO 228 & 228L	General Physiology and General Physiology Lab	4
BIO 230 & 230L	Molecular Cell Biology and Molecular Cell Biology Laboratory	4
BIO 317 & 317L	Microbiology and Microbiology Laboratory	4
BIO 330	Seminar in Molecular/Cellular Biology	1
BIO 385	Introduction to Research	2
BIO 485	Research in Biology	2
Choose one of the following:		4
BIO 331 & 331L	Biotechnology and Biotechnology Laboratory	
BIO 416 & 416L	Cellular Physiology and Cellular Physiology Laboratory	
Electives		
Select from the following electives to total 37 hours in Biology: ¹		4
BIO 160	Science Writing and Communication	
BIO 209 & 209L	Marine Biology and Marine Biology Lab	
BIO 232 & 232L	Animal Behavior and Animal Behavior Laboratory	
BIO 235 & 235L	Foundations of Neuroscience and Foundations of Neuroscience Laboratory	
BIO 240	Cats' Paws and Catapults: Animal Biomechanics	
BIO 248	Issues in Environmental Biology	
BIO 270	Environments of Ecuador	
BIO 308 & 308L	Vertebrate Natural History and Vertebrate Natural History Laboratory	
BIO 312	Evolution	
BIO 315	Statistical Methods for Biologists	
BIO 316 & 316L	Conservation Biology and Conservation Biology Laboratory	
BIO 318	Immunology	

BIO 321 & 321L	Comparative Vertebrate and Human Anatomy and Comparative Vertebrate and Human Anatomy Lab	
BIO 323 & 323L	Ecology and Ecology Laboratory	
BIO 331 & 331L	Biotechnology and Biotechnology Laboratory	
BIO 332 & 332L	Ornithology and Ornithology Lab	
BIO 335 & 335L	Plant-Animal Interactions and Plant-Animal Interactions Laboratory	
BIO 340	Medical Terminology	
BIO 410	Pathophysiology	
BIO 412	Emerging Infectious Diseases and Their Impact on Global Health	
BIO 416 & 416L	Cellular Physiology and Cellular Physiology Laboratory	
BIO 417	Cancer Biology	
BIO 497	Independent Study ¹	
BIO 499	Internship ¹	
Required Supporting Courses		
CHEM 121 & 121L	Principles of Chemistry I and Principles of Chemistry I Laboratory	8
& CHEM 122 & CHEM 122L	and Principles of Chemistry II and Principles of Chemistry II Laboratory	
CHEM 221	Organic Chemistry I	3
CHEM 221L	Organic Chemistry I Laboratory	1
Select one of the following sequences for 2-3 semesters:		8
For students who could use College calculus prep to excel in later courses.		
MATH 103	Precalculus	
For calculus ready students, select one of the following sequences for two semesters. Based on Math Placement Test, Calculus prep, and grad degree plans.		
MATH 131 & MATH 132	Calculus I and Calculus II for STEM majors	
MATH 133 & MATH 114	Theory and Application of Calculus and Introduction to Statistics	
MATH 131 & MATH 114	Calculus I and Introduction to Statistics	
MATH 113 & MATH 114	Survey of Calculus and Introduction to Statistics	
Note: Students should take option 1 or 2 if they like Math or are interested in Pharmacy, Optometry, DMD, DDS, MD/DO, DVM, some MS or PhD programs, or pursuing a Major to Chemistry (including Biochemistry), Physics, or Math. Options 3 and 4 are acceptable for MD/DO, PA, PT, OT, DVM, and some Biology MS or PhD programs and most Neurobiology graduate programs.		
One of the following to fulfill upper level Research Writing Course:		3
BIO 209	Marine Biology	
BIO 230	Molecular Cell Biology	
BIO 232	Animal Behavior	
BIO 316	Conservation Biology	
BIO 323	Ecology	
BIO 335	Plant-Animal Interactions	

Additional math and/or science courses to bring the total to 60 hours if needed

Total Credits **60**

¹ Up to three hours of non-traditional (nt) credits and a maximum of two non-lab courses of three hours each may be counted toward the required elective hours in biology.

Advanced Writing Proficiency

This proficiency is demonstrated by the approval of 4 scientific pieces of writing based on a directed research project. It also includes successful completion of BIO 385 Introduction to Research and BIO 485 Research in Biology.

Senior Comprehensive

The Senior Comprehensive requirement in Biology is fulfilled by successful completion of BIO 385 Introduction to Research and BIO 485 Research in Biology. It also involves completion of a committee-approved paper and an oral presentation to the department.

Student Learning Outcomes

- The Saint Mary's biology major will demonstrate an understanding of basic biological principles. These include but are not limited to concepts related to the diversity of living organisms, the ecological and evolutionary implications of variations in form and function, eukaryotic cell structure, and functional aspects of the eukaryotic cell.
- The Saint Mary's biology major will be able to explain the genetic basis for variation among living organisms, the relationship between genotypic and phenotypic expression, and the patterns of inheritance as a result of genetic crosses.
- The Saint Mary's biology major will demonstrate an in-depth understanding of cellular and molecular function.
- The Saint Mary's biology major will be able to explain how cellular and molecular mechanisms influence the whole organism.
- The Saint Mary's biology major will complete all learning objectives associated with the Senior Comprehensive.