

# BIOLOGY, INTEGRATIVE, BACHELOR OF SCIENCE - BIO

## Major Requirements (60 hours)

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

Code	Title	Credits
<b>Required</b>		
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	Introduction to Genetics	4
BIO 385	Introduction to Research	2
BIO 485	Research in Biology	2

**Select one from each category, at least two from one category, 4 courses total: 14-16**

### Cellular/Physiological Course:

BIO 230 & 230L	Molecular Cell Biology and Molecular Cell Biology Laboratory	
BIO 228 & 228L	General Physiology and General Physiology Lab	
BIO 235 & 235L	Foundations of Neuroscience and Foundations of Neuroscience Laboratory	
BIO 317 & 317L	Microbiology and Microbiology Laboratory	
BIO 417	Cancer Biology	

### Ecological and Evolutionary Course:

BIO 209 & 209L	Marine Biology and Marine Biology Lab	
BIO 312	Evolution	
BIO 316 & 316L	Conservation Biology and Conservation Biology Laboratory	
BIO 323 & 323L	Ecology and Ecology Laboratory	
BIO 335 & 335L	Plant-Animal Interactions and Plant-Animal Interactions Laboratory	

### Organismal Course:

BIO 232 & 232L	Animal Behavior and Animal Behavior Laboratory	
BIO 240	Cats' Paws and Catapults: Animal Biomechanics	
BIO 308 & 308L	Vertebrate Natural History and Vertebrate Natural History Laboratory	
BIO 321 & 321L	Comparative Vertebrate and Human Anatomy and Comparative Vertebrate and Human Anatomy Lab	
BIO 332 & 332L	Ornithology and Ornithology Lab	

### Electives

Select from the following electives to total 37 hours in Biology: <sup>1</sup> 5-8

BIO 160	Science Writing and Communication	
BIO 209 & 209L	Marine Biology and Marine Biology Lab	
BIO 228 & 228L	General Physiology and General Physiology Lab	
BIO 230 & 230L	Molecular Cell Biology and Molecular Cell Biology Laboratory	
BIO 232 & 232L	Animal Behavior and Animal Behavior Laboratory	
BIO 235	Foundations of Neuroscience	
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 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 330	Seminar in Molecular/Cellular Biology	
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 <sup>1</sup>	
BIO 499	Internship <sup>1</sup>	

### 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 & 221L	Organic Chemistry I and Organic Chemistry I Laboratory	4

Select one of the following sequences for 2-3 semesters: 7-8

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	Calculus I
& MATH 132	and Calculus II for STEM majors
MATH 133	Theory and Application of Calculus
& MATH 114	and Introduction to Statistics
MATH 131	Calculus I
& MATH 114	and Introduction to Statistics
MATH 113	Survey of Calculus
& MATH 114	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

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

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**Total Credits** **54-60**

<sup>1</sup> 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 skills pertaining to and required by participation in environmental courses, courses dealing with organismal biology, and physiological/cellular courses.
- The Saint Mary's biology major will complete all learning objectives associated with the Senior Comprehensive.