

# B.S. IN BIOLOGY AND EDUCATION WITH ENDORSEMENT IN SECONDARY EDUCATION IN BIOLOGY (BY.EDS.BS)

Code	Title	Credits
<b>Major Requirements/Biology (30-31 credits)<sup>1</sup></b>		
BY-119	Introductory Biology Major Seminar	1
BY-109	Introduction to Biodiversity and Evolution <i>(Satisfies Natural Sciences in General Education)</i>	4
BY-110	Introduction to Cell and Molecular Biology	4
BY-216	Introduction to Genetics <i>(Satisfies Technological Literacy (TL) in General Education)</i>	4
BY-310	Biochemistry and Lab	4
BY-495	Senior Seminar	1
Select Option "A" or Option "B"		12-13
Option A		
Complete the following courses:		
BY-205	Zoology	
BY-220	Environmental Biology and Policy	
BY-440	Ecology	
Select one course from the following list:		
BY-317	Tropical Island Ecology	
BY-322	Ichthyology	
BY-324	Applied Microbiology	
BY-342	Coastal Zone Management	
BY-360	The Business of Biotechnology: From the Bench to the Market	
BY-370	Cell Biology	
BY-404	Animal Behavior	
BY-406	Introduction to Neurosciences	
BY-410	Molecular Biology	
BY-430	Neuroscience Beyond Neurons	
BY-431	Immunology	
BY-424	Evolution	
BY-425	Principles of Developmental Biology	
BY-427	Cancer Biology	
BY-450	Research in Molecular Cell Physiology	
BY-475	Endocrinology	
Option B		
BY-375L	Laboratory in Molecular and Cellular Biology	
Select 9 additional Biology credits with at least 4 credits at the 300 or 400 level		
BY-220	Environmental Biology and Policy	
BY-299, BY-399 or BY-499 Independent Study		
BY-201	Introduction to Biotechnology	

BY-209	Environment and Human Health	
BY-211	Physiology with Anatomy I	
BY-212	Physiology with Anatomy II	
BY-223	General Microbiology	
BY-250	Research in Molecular Cell Physiology	
BY-264	Environmental Field Methods	
BY-317	Tropical Island Ecology	
BY-324	Applied Microbiology	
BY-342	Coastal Zone Management	
BY-360	The Business of Biotechnology: From the Bench to the Market	
BY-370	Cell Biology	
BY-404	Animal Behavior	
BY-406	Introduction to Neurosciences	
BY-410	Molecular Biology	
BY-424	Evolution	
BY-425	Principles of Developmental Biology	
BY-427	Cancer Biology	
BY-431	Immunology	
BY-450	Research in Molecular Cell Physiology	
BY-475	Endocrinology	
<b>Major Requirements/Education (24 credits)<sup>2</sup></b>		
ED-250	Psychological and Philosophical Foundations of Education	3
EDS-330	Foundations of Special Education: Child & Adolescent Development and Transition to Adulthood	3
EDS-336	Classroom Management	3
ED-319	Content Literacy	3
ED-320	Teaching English Language Learners in Mainstream Classroom	3
<i>(Satisfies Reasoned Oral Discourse (RD) in General Education)</i>		
Select 9 credits as follows: <sup>3</sup>		
ED-416 & 416S	Clinical Practice and Clinical Practice Seminar	9
<b>Biology Interdisciplinary Requirements (30 credits)</b>		
MA-115	Pre-Calculus Modeling for the Biological Sciences	3
or MA-116 Calculus for the Biological Sciences <i>(Satisfies Mathematics in General Education)</i>		
<i>(Satisfies Mathematics in General Education)</i>		
MA-151	Statistics with Applications	3
CE-111	General Chemistry I	3
CE-111L	General Chemistry Laboratory I	1
CE-112	General Chemistry II	3
CE-112L	General Chemistry Laboratory II	1
CE-241	Organic Chemistry I	3
CE-241L	Organic Chemistry Laboratory I	2
CE-242	Organic Chemistry II	3
PH-105	Physics for the Life Sciences I	3
PH-105L	Physics for the Life Sciences Laboratory I	1
PH-106	Physics for the Life Sciences II	3

PH-106L	Physics for the Life Sciences Laboratory II	1
<b>Education Methods Requirements (6 credits)<sup>3</sup></b>		
ED-369	Methods of Teaching Science for the Secondary Teacher Part I	3
ED-370	Methods of Teaching Science for the Secondary Teacher Part II	3
<b>Free Electives (0 credits)<sup>4</sup></b>		
The number of free electives, if any, will be determined in consultation with your advisor. <sup>4</sup>		
<b>General Education Requirements (30 credits)<sup>5</sup></b>		
Complete 30 credits as outlined on the General Education table. <sup>5</sup>		30
<b>Total Credits</b>		<b>120-121</b>

1  
*BY-102 Applications in Biotechnology (3 cr.), BY-104 Human Biology (3 cr.), BY-105 Introductory Biology and Human Development (3 cr.), and BY-106 The Brain - Highs and Lows (3 cr.) are not available to BY majors.*

2  
*Minimum grade of "C" required for Education Courses*

3  
*Students must complete the appropriate test requirement(s) with a passing score PRIOR to Clinical Practice.*

4  
 Please consult with your advisor regarding the required number of free electives that must be completed.

5  
*The General Education curriculum requires the completion of 45 credits. However, students may be able to share credits from within their major or interdisciplinary requirements. Please consult with your advisor to determine which General Education (<http://catalog.monmouth.edu/undergraduate-catalog/academic-programs-support-services-regulations/general-education-requirements/>) courses must be completed.*

## Additional Endorsements Available

- TSD - Teacher of Students with Disabilities - Secondary
- ESL - English as a Second Language - Secondary

## Notes

- 54 credits must be completed at the 200 level or higher.
- Education majors are required to have an overall GPA of 3.00 for State Certification.
- By state regulation, all Education Majors seeking content area endorsement must complete 30 content credits (12+ credits at the 300+ level).

## Sequence Chart

First Year			
Fall	Credits	Spring	Credits
BY-109 Introduction to Biodiversity and Evolution or 110		4 EN-102 College Composition II	3
BY-119 Introductory Biology Major Seminar		1 BY-110 Introduction to Cell and Molecular Biology or 109	4
CE-111 & 111L		4 CE-112 & 112L	4

MA-115 Pre-Calculus Modeling for the Biological Sciences or 116	3	ED-250 Psychological and Philosophical Foundations of Education	3
EN-101 College Composition I	3	FO-xxx Gen*Ed World Language	3
<b>Semester Credits</b>		<b>15 Semester Credits</b>	<b>17</b>
<b>Second Year</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
BY-216 Introduction to Genetics (Gen*Ed Technological Literacy (TL))		4 BY-xxx Biology Elective	3
CE-241 & 241L		5 CE-242 Organic Chemistry II	3
ED-320 Teaching English Language Learners in Mainstream Classroom (Gen*Ed Reasoned Oral Discourse (RD) and Writing Intensive (WT))		3 EDS-330 Foundations of Special Education: Child & Adolescent Development and Transition to Adulthood	3
Gen*Ed Aesthetics (AT) AR,DA,MU,TH		3 Gen*Ed Cultural Diversity (CD) or Global Understanding (GU)	3
		Gen*Ed Social Science Survey (SS.SV)	3
<b>Semester Credits</b>		<b>15 Semester Credits</b>	<b>15</b>
<b>Third Year</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
BY-xxx Biology Elective		3 BY-xxx Biology Elective	3
BY-310 Biochemistry and Lab		4 PH-106 & 106L	4
PH-105 & 105L		4 MA-151 Statistics with Applications	3
EDS-336 Classroom Management		3 Gen*Ed Historical Perspectives (HS.SV)	3
		ED-319 Content Literacy	3
<b>Semester Credits</b>		<b>14 Semester Credits</b>	<b>16</b>
<b>Fourth Year</b>			
<b>Fall</b>	<b>Credits</b>	<b>Spring</b>	<b>Credits</b>
ED-369 Methods of Teaching Science for the Secondary Teacher Part I		3 ED-416 Clinical Practice	8
ED-370 Methods of Teaching Science for the Secondary Teacher Part II		3 ED-416S Clinical Practice Seminar	1
Gen*Ed Historical Perspectives (HS.SV) or Social Science Survey (SS.SV)		3 Gen*Ed Interdisciplinary Perspectives	3
BY-xxx Biology Elective		3	
BY-4xx Biology Elective		3-4	
BY-495 Senior Seminar		1	
<b>Semester Credits</b>		<b>16-17 Semester Credits</b>	<b>12</b>
<b>Total Credits 120-121</b>			