

# BIOLOGY, B.S.ED.

Traditionally one of the strengths at Millersville, this program prepares students to be teaching biologists. Our goal is graduates who are highly competent biologist who are also highly effective in teaching biology at the secondary school level. The four-year program includes broad training in the physical and biological sciences and extensive coursework in professional education. Students who already hold baccalaureate pedigrees may also apply to be Biology certification students.

## Major in Biology, BSE

Code	Title	Hours
<b>BIOLOGY FOUNDATIONS</b>		
Foundations of Biology with C- or higher		
BIOL 101	Foundations of Biology	4
<b>REQUIRED BIOLOGY COURSES</b>		
Biology majors must earn grades of C- (C minus) or higher in BIOL 101, 211, 221, 343, 362 and 364.		
BIOL 211	Concepts of Zoology	4
BIOL 221	Concepts of Botany	4
BIOL 343	Principles of Ecology & Evolution	4
BIOL 362	Cell and Developmental Biology	4
BIOL 364	Foundations of Genetics & Molecular Biology	4
BIOL 375	Biometry	3
BIOL 473	Methods/Teaching Biological Issues in the Secondary School	1
<b>ELECTIVES</b>		
undefined - Choose 4 hours from:		4
Any BIOL course(s)		
Note: This requirement may not be satisfied with BIOL 100, BIOL 204, BIOL 205, BIOL 207, BIOL 208, BIOL 247, BIOL 281, or BIOL 340.		
<b>Total Hours</b>		<b>32</b>

## Professional Education

Code	Title	Hours
<b>EDUCATIONAL FOUNDATIONS</b>		
EDFN 211	Foundations Modern Education	3
EDFN 241	Psychological Foundations of Teaching	3
<b>REQUIRED EDUCATION COURSES</b>		
EDSE 321	Issues in Secondary Education	3
EDFN 330	Instructional Technology, Design & Assessment	3
EDSE 435	Teaching of Science in Secondary Schools	3
<b>ACCOMMODATIONS AND ADAPTATIONS</b>		
EDSE 340	Content Area Literacy for Diverse Classrooms	3
SPED 346	Secondary Students w/Disabilities in Inclusive Settings	3
<b>STUDENT TEACHING</b>		
EDSE 471	Student Teaching Seminar	3
EDSC 461	Student Teaching in Science	9
<b>Total Hours</b>		<b>33</b>

## Req Related for Biology, BSE

Code	Title	Hours
For Biology Majors the G2 block of the Liberal Arts Core will be fulfilled by your required related coursework.		
<b>CHEMISTRY</b>		
A C- or higher in CHEM 111 and 112 is a pre-requisite for CHEM 235. A C- or higher in CHEM 231 is a pre-requisite for CHEM 232. Students considering going to graduate school for an advanced degree in Biology should take CHEM 231 + 232.		
CHEM 111	Introductory Chemistry 1	4
CHEM 112	Introductory Chemistry 2	4
Organic Chemistry - Choose 1 of the following options 1-2:		4-8
Option 1. Organic Chemistry I and II		
CHEM 231	Organic Chemistry 1	
CHEM 232	Organic Chemistry 2	
Option 2. Short Course in Organic Chemistry		
CHEM 235	Organic Chemistry	
Biochemistry Chemistry I		4
CHEM 326	Biochemistry 1	
<b>EARTH SCIENCE</b>		
Earth Science 200-level and above - Choose 1 class from:		
Any 2-level ESCL course(s)		
Any 3-level ESCL course(s)		
Any 4-level ESCL course(s)		
<b>MATHEMATICS</b>		
Students considering graduate or professional school should take MATH 161.		
Precalculus, Calculus I or Honors Calculus - Choose 1 of the following:		4-5
MATH 160	Precalculus	
MATH 161	Calculus 1	
MATH 163H	Honors Calculus 1	
<b>PHYSICS</b>		
undefined - Choose 1 of the following options 1-2:		8-10
Option 1. Physics with Algebra		
PHYS 131	Physics 1 with Algebra	
PHYS 132	Physics 2 with Algebra	
Option 2. Physics with Calculus		
PHYS 231	Physics 1 with Calculus	
PHYS 232	Physics 2 with Calculus	
<b>Total Hours</b>		<b>28-35</b>
<b>Advanced Professional Studies, BSE</b>		
Code	Title	Hours
*Clearances are valid for one year from the date that appears in the header of this degree audit in the field 'Clearance Date.' Clearances cannot expire in the middle of a semester.		
<b>APS REQUIREMENTS</b>		
English Composition - Choose 1 of the following:		3
ENGL 110	English Composition	
ENGL 110H	Hnrs:English Composition	
English Literature - Choose 1 of the following:		3
ENGL 230	Introduction to Literature	

ENGL 231	World Literature 1
ENGL 232	World Literature 2
ENGL 233	Early British Literature
ENGL 234	Later British Literature
ENGL 235	American Literary Tradition I
ENGL 236	American Literary Tradition II
ENGL 241H	H:Explorations in World Lit
ENGL 242	Reading Our World:
ENGL 292	Science Fiction
ENGL 333	African-American Literature 1
ENGL 333H	Hnrs:African American Lit 1
ENGL 334	African American Literature 2
ENGL 334H	Hnrs:African American Lit 2
ENGL 336	New Dimensions to World Lit
ENGL 338	Folklore and Literature
ENGL 401	Old Eng Lang and Literature
ENGL 402	Middle Eng Lang and Literature

#### Mathematics

Two Mathematics courses are required for BSE students. You have taken 0 course(s). It is preferable to take two courses designated as G2. Click [here](#) to search for MATH courses on the current web schedule. BIOL 375 will fulfill one Mathematics course for BSE BIOL students.

EDFN 211	Foundations Modern Education	6
& EDFN 241	and Psychological Foundations of Teaching	
48 earned (transcript) credit hours are required		

#### APS registration status

You ARE NOT eligible to register for courses requiring APS status.

#### ACT 126 - Educator Ethics Training

You must submit your Educator Ethics Training.

#### Pre-Service Testing Required

Pre-Service Testing Status is indicated by one of the following: 1.) PSTA - Pre-Service Testing Accomplished: Verified passing pre-service test scores meet the requirement. 2.) PSTI - Pre-Service Testing Incomplete: Non-passing pre-service test scores were submitted prior to the August 1, 2015 policy change. Passing scores must still be achieved in order to meet the PA certification requirements. 3.) PSTU - Pre-Service Testing Unverified: Unofficial copies of pre-service test scores were submitted. Official scores must be sent from the testing company in order to meet PA certification requirements. 4.) PSTX - Pre-Service Testing Waived: Per PDE - ACT 136, the Pre-Service Testing Requirement has been waived.

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**Your GPA is below 3.0 - please see an advisor**

If you are given the 2.8 GPA Exception for graduation and you graduate with a GPA lower than 3.0, you must have higher certification test scores in order to meet PA state certification requirements.

#### No dispositions-related holds

If the requirement above is checked as complete, then there are currently no dispositions-related holds on your APS Status. Registration for APS courses is permitted when all APS requirements have been met. If it is incomplete, you have a hold and APS registration will not be allowed.

#### Full Admission to APS

When all requirements are met, you must submit application for admission to APS status. Click [here](#) for the application.

#### Total Hours

**12**