

# ECOLOGY (BS)

## Program Description

The Ecology program is intended for students interested in pursuing a career or postgraduate training in ecology. This major prepares you for careers in areas including forestry, fisheries, agriculture, wildlife management, environmental education, and work at a zoo or aquarium.

## Entering and Completing the Major

In order to earn a degree, you must complete at least one academic major. SPU encourages students to explore various academic paths, so if you change your mind about a major, or want to include an additional program, you are able to do so, as outlined below.

Note that the University encourages you to enter your chosen major(s) as soon as you have determined it and are eligible to join it, especially by the start of your junior year. Students who transfer as juniors and seniors should enter a major within their first two quarters at SPU.

- If this is your first quarter at SPU and you identified a major in this department as your first choice on your application for admission to the University, you have gained entry to the major. To change or add a major, follow these instructions (<https://spu.atlassian.net/1/cp/a3th1keb/>).
- If you are an SPU student with an SPU cumulative GPA of 2.0 or better, follow these instructions (<https://spu.atlassian.net/1/cp/a3th1keb/>) to enter a major in this department.
- The University requires a grade of C- or better in all classes that apply to a major; however, programs may require higher minimum grades in specific courses. You may repeat an SPU course only once for a higher grade.
- To advance in this program, meet with your faculty advisor regularly to discuss your grades, course progression, and other indicators of satisfactory academic progress. If your grades or other factors indicate that you may not be able to successfully complete the major or minor, your faculty advisor can work with you to explore options, which may include choosing a different major.
- You must complete the major requirements that are in effect in the SPU Undergraduate Catalog for the year you enter the major.

## Ecology (BS)

94 Credits Minimum, Including 44 Upper Division (UD)

Code	Title	Credits
<b>Biology Core Requirements</b>		
BIO 2101	General Biology	5
BIO 2102	General Biology	5
BIO 2103	General Biology	5
BIO 3310	Ecology	5
BIO 3325	Genetics	5
BIO 3899	Scientific Literature <sup>1</sup>	1
BIO 4330	Evolutionary Mechanisms	5
Section Credits Required		31
<b>Botany Elective</b>		
Select one of the following:		5
BIO 3302	Coral Reef Ecology <sup>2</sup>	
BIO 3453	Biodiversity: Plant Identification and Taxonomy	

BIO 4744	Marine Botany	
BIO 4825	Forest Ecology <sup>2</sup>	
Section Credits Required		5
<b>Applied Ecology <sup>2</sup></b>		
Select two of the following:		10
BIO 3303	Evolutionary Ecology in the Galapagos Islands	
BIO 3304	Oceanography of the Galapagos Archipelago	
BIO 3305	Marine Restoration Ecology	
BIO 3436	Behavioral Ecology	
BIO 4810	Marine Ecology	
BIO 4815	Aquatic Ecology	
BIO 4835	Conservation Biology	
BIO 4840	Chemical Ecology	
Section Credits Required		10
<b>Chemistry Core</b>		
CHM 1211	General Chemistry I	5
CHM 1212	General Chemistry II	5
CHM 1330	Survey of Organic Chemistry	5
or CHM 3371 Organic Chemistry I		
Section Credits Required		15
<b>Quantitative Core</b>		
BIO 4360	Biostatistics	5
MAT 2360	Introduction to Statistics for the Sciences	5
Select one of the following:		5
MAT 1221	Survey of Calculus	
MAT 1234	Calculus I	
MAT 3333	Statistical Modeling	
MAT 3380	Introduction to Data Science	
Section Credits Required		15
<b>General Electives <sup>3</sup></b>		
Select 15 credits of the following or any course listed above not already being used.		15
BIO 1130	Advanced Open Water Diving	
BIO 1145	Oceanography	
BIO 3000	Introduction to Biological Anthropology	
BIO 3130	Scientific Diving	
BIO 3432	Biodiversity: Vertebrate Biology	
BIO 3434	Animal Behavior	
BIO 3835	Theological Ecology	
BIO 4256	Environmental Physiology	
BIO 4413	Animal Physiology	
BIO 4415	Plant Physiology	
BIO 4418	Neurobiology	
ECN 3500	Environmental Economics	
PHY 3011	Global Climate Change: Scientific, Social and Moral Implications	
Section Credits Required		15
<b>Capstone Experience</b>		
Select one of the following Groups:		3
Group A:		
BIO 4615	Bioethics	
Group B:		

BIO 4978	Biological Research Proposal	
BIO 4979	Biological Research	
Section Credits Required		3
<b>Field Biology <sup>4</sup></b>		
Select five credits of the following:		
BIO 3302	Coral Reef Ecology	
BIO 3303	Evolutionary Ecology in the Galapagos Islands	
BIO 3304	Oceanography of the Galapagos Archipelago	
BIO 3305	Marine Restoration Ecology	
BIO 3436	Behavioral Ecology	
BIO 4256	Environmental Physiology	
BIO 4744	Marine Botany	
BIO 4810	Marine Ecology	
BIO 4815	Aquatic Ecology	
BIO 4825	Forest Ecology	
BIO 4835	Conservation Biology	
Section Credits Required		
<b>Total Credits</b>		<b>94</b>

1  
Up to 2 more credits of BIO 3899 can be applied to General Electives category.

2  
BIO 3302 Coral Reef Ecology and BIO 4825 Forest Ecology may count as Applied Ecology electives if not used elsewhere.

3  
At least 5 credits must be lab/field.

4  
Use of these courses in any other area satisfies requirement.

## Additional Requirements and Information

- Max 6 credits from BIO 4900-4999 may be applied to major.

## Suggested Course Sequence

*This suggested course sequence is a potential plan for how to complete the major within four years. Please consult with a departmental faculty advisor for course advisement.*

- Students should take the Chemistry Placement test (available in Canvas) prior to New Student Advising.
  - A Chemistry Placement score  $\geq 35$  is a pre-requisite for BIO 2101 General Biology and CHM 1211 General Chemistry I.
- Students who score  $< 35$  on the Chemistry Placement test, or who would benefit from an introduction to Chemistry, should take CHM 1000 Preparation for General Chemistry in Autumn quarter, then take BIO 2101 General Biology and CHM 1211 General Chemistry I in Winter quarter.

## Four-Year Plan: $\geq 35$ on Chemistry Placement Test

Course	Title	Credits
<b>Freshman</b>		
<b>Autumn</b>		
CHM 1211	General Chemistry I	5

UCOL 1000	University Colloquium	1
<b>Credits</b>		<b>6</b>
<b>Winter</b>		
BIO 2101	General Biology <sup>1</sup>	5
CHM 1212	General Chemistry II	5
<b>Credits</b>		<b>10</b>
<b>Spring</b>		
BIO 2102	General Biology	5
<b>Credits</b>		<b>5</b>
<b>Any Quarter</b>		
WRI 1000	Academic Inquiry and Writing Seminar	5
WRI 1100	Disciplinary Research and Writing Seminar	5
UFDN 1000	The Christian Faith	5
<b>Credits</b>		<b>15</b>
<b>Sophomore</b>		
<b>Autumn</b>		
BIO 2103	General Biology	5
MAT 2360	Introduction to Statistics for the Sciences	5
<b>Credits</b>		<b>10</b>
<b>Winter</b>		
BIO 3325	Genetics	5
CHM 1330	Survey of Organic Chemistry <sup>2</sup>	5
<b>Credits</b>		<b>10</b>
<b>Spring</b>		
BIO 3310	Ecology	5
<b>Credits</b>		<b>5</b>
<b>Any Quarter</b>		
Select 5 credits of Math from the following: <sup>3</sup>		
MAT 1221	Survey of Calculus	
MAT 1234	Calculus I	
MAT 3333	Statistical Modeling	
MAT 3380	Introduction to Data Science	
Select 10 credits of Applied Ecology from the following: (in years 2 - 4) <sup>4</sup>		10
BIO 3303	Evolutionary Ecology in the Galapagos Islands	
BIO 3304	Oceanography of the Galapagos Archipelago	
BIO 3305	Marine Restoration Ecology	
BIO 3436	Behavioral Ecology	
BIO 4810	Marine Ecology	
BIO 4815	Aquatic Ecology	
BIO 4835	Conservation Biology	
BIO 4840	Chemical Ecology	
Select fifteen credits of General Electives in years 2 - 4:		15
BIO 1130	Advanced Open Water Diving	
BIO 1145	Oceanography	
BIO 3000	Introduction to Biological Anthropology	
BIO 3130	Scientific Diving	
BIO 3432	Biodiversity: Vertebrate Biology	
BIO 3434	Animal Behavior	
BIO 3835	Theological Ecology	
BIO 4256	Environmental Physiology	
BIO 4413	Animal Physiology	
BIO 4415	Plant Physiology	
BIO 4418	Neurobiology	
ECN 3500	Environmental Economics	
PHY 3011	Global Climate Change: Scientific, Social and Moral Implications	
Select three credits of Field BIO in years 2 - 4 (see catalog for options). Courses in this category may also count for other categories.		3
<b>Credits</b>		<b>28</b>

<b>Junior</b>		
<b>Winter</b>		
BIO 4360	Biostatistics	5
<b>Credits</b>		<b>5</b>
<b>Spring</b>		
Apply to graduate!		
<b>Credits</b>		<b>0</b>
<b>Any Quarter</b>		
BIO 3899	Scientific Literature	1
Select five credits of Botany from the following:		
BIO 3302	Coral Reef Ecology <sup>5</sup>	
BIO 3453	Biodiversity: Plant Identification and Taxonomy	
BIO 4744	Marine Botany	
BIO 4825	Forest Ecology <sup>5</sup>	
BIO 4978 & BIO 4979	Biological Research Proposal and Biological Research (in years 3 - 4) <sup>6</sup>	3
<b>Credits</b>		<b>4</b>
<b>Senior</b>		
<b>Autumn</b>		
BIO 4615	Bioethics <sup>6</sup>	3
<b>Credits</b>		<b>3</b>
<b>Winter</b>		
BIO 4330	Evolutionary Mechanisms	5
<b>Credits</b>		<b>5</b>
<b>Total Credits</b>		<b>106</b>

1

Students who test at Math Placement Level B and who either score  $\geq 45$  on the Chemistry Placement Test or transfer in the complete General Chemistry sequence may take BIO 2103 General Biology in Autumn 2024.

2

CHM 3371 Organic Chemistry I (Autumn) may be taken instead of CHM 1330 Survey of Organic Chemistry

3

MAT 1221 Survey of Calculus and MAT 1234 Calculus I require a passing score on the Calculus Placement Test (in Canvas). MAT 1234 Calculus I/MAT 1235 Calculus II is recommended for some graduate programs, instead of MAT 1221 Survey of Calculus.

4

Plan ahead as these are primarily summer or inter-term courses. May be applied toward Field Bio credits.

5

BIO 3302 Coral Reef Ecology and BIO 4825 Forest Ecology can be used in Applied Ecology if not used here.

6

Research (BIO 4978 Biological Research Proposal Biological Research Proposal & BIO 4979 Biological Research Biological Research) or BIO 4615 Bioethics may count for the Capstone Experience requirement.

## Freshman Notes

- Take Math Placement Test (in Canvas) if you are at Math Level 0 or A at time of admission.
  - Math Level B is a prerequisite for BIO 2102 General Biology, BIO 2103 General Biology, CHM 1212 General Chemistry II and MAT 2360 Introduction to Statistics for the Sciences.
- Students who test into Level 0 or A should plan to take MAT 0144 College Readiness Math I and/or MAT 0145 College Readiness Math II to achieve Math Level B.

## Sophomore Notes

- MAT 2360 Introduction to Statistics for the Sciences is a pre-requisite for BIO 3325 Genetics and BIO 4360 Biostatistics.
- BIO 3325 Genetics is offered both Autumn and Winter. It is a pre-requisite for BIO 4330 Evolutionary Mechanisms (Winter only).

## Junior Notes

- Physics is recommended for most graduate programs.
- Check the time schedule, as most upper division courses are offered only in certain quarters.

## Four-Year Plan: <35 on Chemistry Placement Test

Course	Title	Credits
<b>Freshman</b>		
<b>Autumn</b>		
CHM 1000	Preparation for General Chemistry	2
UCOL 1000	University Colloquium	1
<b>Credits</b>		<b>3</b>
<b>Winter</b>		
BIO 2101	General Biology	5
CHM 1211	General Chemistry I	5
<b>Credits</b>		<b>10</b>
<b>Spring</b>		
BIO 2102	General Biology	5
CHM 1212	General Chemistry II	5
<b>Credits</b>		<b>10</b>
<b>Any Quarter</b>		
WRI 1000	Academic Inquiry and Writing Seminar	5
WRI 1100	Disciplinary Research and Writing Seminar	5
UFDN 1000	The Christian Faith	5
<b>Credits</b>		<b>15</b>
<b>Sophomore</b>		
<b>Autumn</b>		
BIO 2103	General Biology	5
MAT 2360	Introduction to Statistics for the Sciences	5
<b>Credits</b>		<b>10</b>
<b>Winter</b>		
CHM 1330	Survey of Organic Chemistry <sup>1</sup>	5
<b>Credits</b>		<b>5</b>
<b>Spring</b>		
BIO 3310	Ecology	5
<b>Credits</b>		<b>5</b>
<b>Any Quarter</b>		
Select five credits of Math from the following: <sup>2</sup>		
MAT 1221	Survey of Calculus	
MAT 1234	Calculus I	
MAT 3333	Statistical Modeling	
MAT 3380	Introduction to Data Science	
Select 10 credits of Applied Ecology from the following: (in years 2 - 4) <sup>3</sup>		10
BIO 3303	Evolutionary Ecology in the Galapagos Islands	
BIO 3304	Oceanography of the Galapagos Archipelago	
BIO 3305	Marine Restoration Ecology	
BIO 3436	Behavioral Ecology	
BIO 4810	Marine Ecology	
BIO 4815	Aquatic Ecology	
BIO 4835	Conservation Biology	
BIO 4840	Chemical Ecology	
Select fifteen credits of General Electives in years 2 - 4 (see catalog for course options)		15

BIO 1130	Advanced Open Water Diving	
BIO 1145	Oceanography	
BIO 3000	Introduction to Biological Anthropology	
BIO 3130	Scientific Diving	
BIO 3432	Biodiversity: Vertebrate Biology	
BIO 3434	Animal Behavior	
BIO 3835	Theological Ecology	
BIO 4256	Environmental Physiology	
BIO 4413	Animal Physiology	
BIO 4415	Plant Physiology	
BIO 4418	Neurobiology	
ECN 3500	Environmental Economics	
PHY 3011	Global Climate Change: Scientific, Social and Moral Implications	
Select three credits of Field Bio in years 2 -4 (see catalog for options). Courses in this category may also count for other categories.		3
<b>Credits</b>		<b>28</b>
<b>Junior</b>		
<b>Winter</b>		
BIO 3325	Genetics	5
BIO 4360	Biostatistics	5
<b>Credits</b>		<b>10</b>
<b>Spring</b>		
Apply to graduate!		
<b>Credits</b>		<b>0</b>
<b>Any Quarter</b>		
BIO 3899	Scientific Literature	1
Select five credits of Botany from the following: (in years 3 - 4)		5
BIO 3302	Coral Reef Ecology <sup>4</sup>	
BIO 3453	Biodiversity: Plant Identification and Taxonomy	
BIO 4744	Marine Botany	
BIO 4825	Forest Ecology <sup>4</sup>	
BIO 4978 & BIO 4979	Biological Research Proposal and Biological Research (in years 3 - 4) <sup>5</sup>	3
<b>Credits</b>		<b>9</b>
<b>Senior</b>		
<b>Autumn</b>		
BIO 4615	Bioethics <sup>5</sup>	3
<b>Credits</b>		<b>3</b>
<b>Winter</b>		
BIO 4330	Evolutionary Mechanisms	5
<b>Credits</b>		<b>5</b>
<b>Total Credits</b>		<b>113</b>

1

CHM 3371 Organic Chemistry I (Autumn) may be taken instead of CHM 1330 Survey of Organic Chemistry

2

MAT 1221 Survey of Calculus Survey of Calculus and MAT 1234 Calculus I Calculus I require a passing score on the Calculus Placement Test (in Canvas). MAT 1234 Calculus I Calculus I/MAT 1235 Calculus II Calculus II is recommended for some graduate programs, instead of MAT 1221 Survey of Calculus Survey of Calculus.

3

Plan ahead as these are primarily summer or inter-term courses. May be applied toward Field Bio credits.

4

BIO 3302 Coral Reef Ecology Coral Reef Ecology and BIO 4825 Forest Ecology Forest Ecology can be used in Applied Ecology if not used here.

5

Research (BIO 4978 Biological Research Proposal & BIO 4979 Biological Research) or BIO 4615 Bioethics may count for the Capstone Experience requirement.

## Freshman Notes

- Take Math Placement Test (in Canvas) if you are at Math Level 0 or A at time of admission.
  - Math Level B is a prerequisite for BIO 2102 General Biology, BIO 2103 General Biology, CHM 1212 General Chemistry II and MAT 2360 Introduction to Statistics for the Sciences.
- Students who test into Level 0 or A should plan to take MAT 0144 College Readiness Math I and/or MAT 0145 College Readiness Math II to achieve Math Level B.
- BIO 2102 General Biology and BIO 2103 General Biology can be taken in either order.

## Sophomore Notes

- MAT 2360 Introduction to Statistics for the Sciences is a pre-requisite for BIO 3325 Genetics and BIO 4360 Biostatistics.

## Junior Notes

- BIO 3325 Genetics is offered both Autumn and Winter. It is a pre-requisite for BIO 4330 Evolutionary Mechanisms (Winter only).
- Physics is recommended for most graduate programs.
- Check the time schedule, as most upper division courses are offered only in certain quarters.