

# MAJOR IN AGRICULTURAL BIOLOGY, PLANT PATHOLOGY CONCENTRATION

The Agricultural Biology major with a concentration in Plant Pathology provides a strong scientific foundation in plant pathology to address challenges in natural and managed systems. Students will gain tools to foster sustainability and address pressing issues involving biophysical and sociocultural components of these systems. The major features courses in agriculture, biology, and ecology as well as practical training through internships and/or research experiences. Students will learn the complex interactions that occur among microbes, insects, and plant species in natural and managed ecosystems and develop skills to use systems thinking to solve real-world problems. Knowledge and skills gained from the major will enable students to identify and solve complex problems in natural and managed systems, especially implementing effective and sustainable pest management.

- Demonstrate understanding of social, economic, and biophysical aspects of the management of biological problems in natural and managed ecosystems
- Describe, assess, analyze, and synthesize knowledge from across the curriculum to create solutions for pests and beneficial species in natural and managed ecosystems
- Promote and practice inclusion to form effective teams that solve complex problems in natural and managed ecosystems
- Communicate effectively with diverse audiences regarding sustainable pest and pathogen management in natural and managed ecosystems

## Potential Occupations

This major will be an excellent choice for students interested in careers as researchers, crop advisors, extension educators, growers, agriculture consultants, production managers, inspectors, diagnosticians, regulatory professionals and for those who wish to pursue careers in academia.

## Requirements Effective Fall 2021

### Learning Outcomes

- Integrate skills and knowledge to solve problems related to plants, insects, and microbes in natural and managed ecosystems

#### Freshman

		AUCC	Credits
AB 120 <sup>1,2</sup>	Agricultural Biology--Freshman Orientation		1
AB 130 <sup>1,2</sup>	Working with Agricultural Biology Data		1
AREC 202	Agricultural and Resource Economics (GT-SS1)	3C	3
CHEM 107	Fundamentals of Chemistry (GT-SC2)	3A	4
CHEM 108	Fundamentals of Chemistry Laboratory (GT-SC1)	3A	1
CO 150	College Composition (GT-CO2)	1A	3
Select one group from the following:			8
Group A			
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	
LIFE 103	Biology of Organisms-Animals and Plants (GT-SC1)	3A	
Group B			
BZ 110	Principles of Animal Biology (GT-SC2)	3A	
BZ 111	Animal Biology Laboratory (GT-SC1)	3A	
BZ 120	Principles of Plant Biology (GT-SC1)	3A	
Arts and Humanities ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )			6
Electives			3
<b>Total Credits</b>			<b>30</b>

#### Sophomore

AB 230 <sup>1,2</sup>	Becoming an Agricultural Biology Professional		1
BSPM 302 <sup>1</sup>	Applied and General Entomology		2
CHEM 245	Fundamentals of Organic Chemistry		4
CHEM 246	Fundamentals of Organic Chemistry Laboratory		1
MATH 155	Calculus for Biological Scientists I (GT-MA1)	1B	4
SPCM 200	Public Speaking		3
Select one course from the following:			1-2
BSPM 303A <sup>1</sup>	Entomology Laboratory: General		

BSPM 303B <sup>1</sup>	Entomology Laboratory: Horticultural		
BSPM 303C <sup>1</sup>	Entomology Laboratory: Agricultural		
Select one course from the following:			3
LAND 220/LIFE 220 <sup>1</sup>	Fundamentals of Ecology (GT-SC2)	3A	
LIFE 320 <sup>1</sup>	Ecology		
Select one course from the following:			3
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)	2	
JTC 300	Strategic Writing and Communication (GT-CO3)	2	
LB 300	Specialized Professional Writing	2	
Select one course from the following:			3
AGRI 116/IE 116	Plants and Civilizations (GT-SS3)	3E	
HORT 171/SOCR 171	Environmental Issues in Agriculture (GT-SS3)	3E	
SOC 220	Environment, Food, and Social Justice (GT-SS3)	3E	
Select one course from the following:			3
STAT 301	Introduction to Applied Statistical Methods		
STAT 307	Introduction to Biostatistics		
<b>Total Credits</b>			<b>28-29</b>

**Junior**

AB 330 <sup>1</sup>	Applications in Agricultural Biology I	4A,4B,4C	2
BSPM 308 <sup>1</sup>	Ecology and Management of Weeds		3
BSPM 361 <sup>1</sup>	Elements of Plant Pathology		3
BSPM 487	Internship		3
BZ 220 <sup>1</sup>	Introduction to Evolution		3
BZ 350 <sup>1</sup>	Molecular and General Genetics		4
SOCR 240 <sup>1</sup>	Introductory Soil Science		4
Plant Pathology Elective (see list below) <sup>1</sup>			3
Electives			5
<b>Total Credits</b>			<b>30</b>

**Senior**

AB 310 <sup>1</sup>	Understanding Pesticides		3
AB 430 <sup>1</sup>	Applications in Agricultural Biology II	4A,4B,4C	3
AGED 210	History of Agriculture in the United States	3D	3
BSPM 451 <sup>1</sup>	Integrated Pest Management		3
Plant Pathology Electives (see list below) <sup>1</sup>			9
Electives <sup>3</sup>			10-11
<b>Total Credits</b>			<b>31-32</b>
<b>Program Total Credits:</b>			<b>120</b>

**Plant Pathology Electives**

Code	Title	Credits
Select a minimum of 12 credits from the following:		
BSPM 365	Integrated Tree Health Management	4
BSPM 450	Molecular Plant-Microbe Interaction	3
BSPM 521	Forest Health Issues	3
BZ 333	Introductory Mycology	4
BZ 350	Molecular and General Genetics	4
MIP 300	General Microbiology	3
Lecture/laboratory combination:		
MIP 432/ESS 432	Microbial Ecology	4
MIP 433/ESS 433	Microbial Ecology Laboratory	4

Lecture/laboratory combination:	4
SOCR 455	Soil Microbiology
SOCR 456	Soil Microbiology Laboratory

- <sup>1</sup> A minimum grade of 'C' (2.000) must be obtained in this course in order to complete the program.
- <sup>2</sup> Transfer students are required to take AB 270 in lieu of AB 120, AB 130, and AB 230.
- <sup>3</sup> Select enough elective credits to bring the program total to 120, of which at least 42 must be Upper-Division (300- to 400-level).

## Major Completion Map

**Distinctive Requirements for Degree Program:** Each course used to satisfy requirements of the major requires a minimum grade of 'C' (2.000).

**To prepare for first semester:** The curriculum for the Agricultural Biology major assumes students enter college prepared to take calculus.

Entering students who are not prepared to take calculus will need to fulfill pre-calculus requirements in the first semester. Those pre-calculus requirements are listed as benchmark courses in Freshman Semester 1 below.

### Freshman

Semester 1		Critical	Recommended	AUCC	Credits
AB 120	Agricultural Biology–Freshman Orientation	X			1
AREC 202	Agricultural and Resource Economics (GT-SS1)	X		3C	3
CO 150	College Composition (GT-CO2)	X		1A	3
Arts and Humanities ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )				3B	3
Electives					3
MATH 117, MATH 118, MATH 124, MATH 125 may be necessary for some students to fulfill pre-calculus requirements.		X			

#### Total Credits

13

Semester 2		Critical	Recommended	AUCC	Credits	
AB 130	Working with Agricultural Biology Data	X			1	
CHEM 107	Fundamentals of Chemistry (GT-SC2)	X		3A	4	
CHEM 108	Fundamentals of Chemistry Laboratory (GT-SC1)	X		3A	1	
Select one group from the following:					8	
Group A:						
LIFE 102	Attributes of Living Systems (GT-SC1)	X		3A		
LIFE 103	Biology of Organisms-Animals and Plants (GT-SC1)	X		3A		
Group B:						
BZ 110	Principles of Animal Biology (GT-SC2)	X		3A		
BZ 111	Animal Biology Laboratory (GT-SC1)	X		3A		
BZ 120	Principles of Plant Biology (GT-SC1)	X		3A		
Arts and Humanities ( <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities">http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities</a> )				X	3B	3

#### Total Credits

17

### Sophomore

Semester 3		Critical	Recommended	AUCC	Credits
BSPM 302	Applied and General Entomology	X			2
MATH 155	Calculus for Biological Scientists I (GT-MA1)	X		1B	4
SPCM 200	Public Speaking	X			3
Select one course from the following:					1-2
BSPM 303A	Entomology Laboratory: General				
BSPM 303B	Entomology Laboratory: Horticultural				
BSPM 303C	Entomology Laboratory: Agricultural				
Select one course from the following:					3
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)			2	
JTC 300	Strategic Writing and Communication (GT-CO3)			2	
LB 300	Specialized Professional Writing			2	
Select LAND 220/LIFE 220 Semester 3 if LIFE 320 will not be taken Semester 4:		X			0-3
LAND 220/ LIFE 220	Fundamentals of Ecology (GT-SC2)			3A	

#### Total Credits

13-14

Semester 4		Critical	Recommended	AUCC	Credits
AB 230	Becoming an Agricultural Biology Professional	X			1

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CHEM 245	Fundamentals of Organic Chemistry	X		4
CHEM 246	Fundamentals of Organic Chemistry Laboratory	X		1
Choose one of the following:		X	3E	3
AGRI 116/ IE 116	Plants and Civilizations (GT-SS3)		3E	
HORT 171/ SOCR 171	Environmental Issues in Agriculture (GT-SS3)		3E	
SOC 220	Environment, Food, and Social Justice (GT-SS3)		3E	
Select LIFE 320 Semester 4 if LAND 220/LIFE 220 was not taken Semester 3:				0-3
LIFE 320	Ecology			
Select one course from the following:		X		3
STAT 301	Introduction to Applied Statistical Methods			
STAT 307	Introduction to Biostatistics			

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**Total Credits** **15**

**Junior**

<b>Semester 5</b>		<b>Critical</b>	<b>Recommended</b>	<b>AUCC</b>	<b>Credits</b>
AB 330	Applications in Agricultural Biology I	X		4A,4B,4C	2
BSPM 308	Ecology and Management of Weeds	X			3
BZ 220	Introduction to Evolution	X			3
BZ 350	Molecular and General Genetics	X			4
SOCR 240	Introductory Soil Science	X			4

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**Total Credits** **16**

<b>Semester 6</b>		<b>Critical</b>	<b>Recommended</b>	<b>AUCC</b>	<b>Credits</b>
BSPM 361	Elements of Plant Pathology	X			3
BSPM 487	Internship	X			3
Plant Pathology Electives (see list on Concentration Requirements Tab)					3
Electives			X		5

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**Total Credits** **14**

**Senior**

<b>Semester 7</b>		<b>Critical</b>	<b>Recommended</b>	<b>AUCC</b>	<b>Credits</b>
AB 430	Applications in Agricultural Biology II	X		4A,4B,4C	3
Plant Pathology Electives (see list on Concentration Requirements Tab)					3
Electives			X		9

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**Total Credits** **15**

<b>Semester 8</b>		<b>Critical</b>	<b>Recommended</b>	<b>AUCC</b>	<b>Credits</b>
AB 310	Understanding Pesticides	X			3
AGED 210	History of Agriculture in the United States	X		3D	3
BSPM 451	Integrated Pest Management	X			3
Plant Pathology Electives (see list on Concentration Requirements Tab)					6
Electives			X		1-2
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.					

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**Total Credits** **16-17**

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**Program Total Credits:** **120**