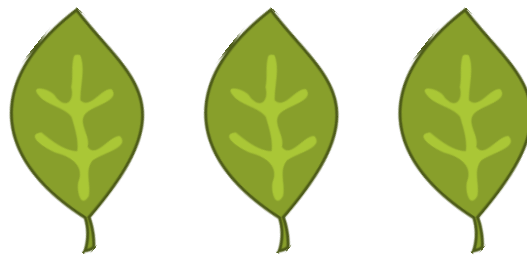


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# Plant Sciences

## Student Handbook

2016-2017



**PennState**  
College of Agricultural Sciences

Department of Plant Science  
Undergraduate Advising Office  
117 Tyson Building  
University Park, PA 16802  
[plantscience.psu.edu](http://plantscience.psu.edu)

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## Introduction

Welcome to the Department of Plant Science at Penn State! This student hand book is designed to give you an overview of the Plant Sciences major and to provide you with information related to graduation requirements, career opportunities and course curriculum.

Our goal is to prepare students to succeed in a broad range of careers related to the production, use, improvement, management, and protection of plants and plant-based products. We will meet this objective by providing students with a large selection of rigorous current and relevant courses in the College of Agricultural Sciences in traditional plant science disciplines including Agronomy, Horticulture, Entomology, Plant Pathology, and Soil Science along with supporting courses offered by other colleges at Penn State.

## Major Overview

The Plant Sciences major is an applied biological science baccalaureate degree program designed for students seeking careers in agronomic and horticultural crop production systems and enterprise management, agroecology, sustainable and organic managed and natural ecosystems, crop protection, applied plant physiology, plant science research, and plant biotechnology.

Students in the Plant Sciences major will gain a working knowledge of basic plant biology, soils, pests, and pathogens with emphasis on growth, development, and physiology in an ecological and agricultural context. Students will also learn the scientific, technical, and computational approaches to problem solving in an ecological and agricultural context, individually and in teams, and will have the ability to analyze ethical issues regarding ecosystem sustainability, business practices and plant science, and critically evaluate and respect different viewpoints in making management decisions. Students will also attain a high level of proficiency in written and oral communication, particularly with regard to critical evaluation of scientific issues.

There are five options in the major including an option in Agroecology, Crop Production, Horticulture, Plant Science and Plant Genetics and Biotechnology. This provides students with the flexibility for concentrations in areas including production and management systems related to agronomic and horticultural crops, plant biotechnology and breeding, crop physiology, ecology, agroecology, and other aspects of general plant science. Students can choose from diverse course offerings in designing a program of study suited to their needs and professional goals.

For more information about the program, please contact:

Dr. Dennis Decoteau  
Program Coordinator, Plant Sciences  
Department of Plant Science  
010 Tyson Building  
University Park, PA 16802  
[drd10@psu.edu](mailto:drd10@psu.edu)  
(814) 865-5587

## Advising Information

Advising at Penn State should be viewed as a shared responsibility between the adviser and the advisee. Active participation in both parties is the key to successful advising.

When you enter the Plant Sciences major you will be assigned a faculty adviser who will work in tandem with the department's advising coordinator. Your advisers will help you understand your academic strengths and help you achieve your educational goals. Your advisers will also provide guidance with academic planning, career and internship opportunities, and recommend appropriate course selections.

Students are responsible for developing and implementing their academic plan in conjunction with a Plant Science adviser. Your adviser can be an invaluable resource and mentor. Students are encouraged to meet with their adviser on a regular basis (at least once a semester). Email is the most effective method for arranging an appointment or for getting a question answered by your adviser. Contact them well in advance of registration and other academic deadlines.

Students should take an active role in planning their course work in order to meet all requirements and to graduate in a timely manner. Keep track of your progress by reviewing your Degree Audit on eLion (<https://elion.psu.edu/>) and updating your Plant Science checksheet (pages 14-18 depending on your option) each semester.

Your advisers are committed to making your experience at Penn State enjoyable and fulfilling. Please let us know how we can help you achieve your educational and personal goals. We look forward to working with you in the Plant Sciences!

For more information about advising, please contact:

Tarrah Geszvain  
Advising Coordinator, Department of Plant Science  
117 Tyson Building  
University Park, PA 16802  
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(814) 863-6087

## **Program Options**

### **AGROECOLOGY:**

This option applies an ecological approach to understanding and managing cropping systems to meet societies' needs while enhancing environmental protection and resource conservation. Students will develop skills to manage agroecosystems for sustainable productivity, profitability and environmental protection by studying plant and soil sciences, ecology, and pest management from a systems perspective. The curriculum prepares students for a wide range of careers in agricultural and ecological fields, sustainable food production, and for graduate studies.

### **CROP PRODUCTION:**

This option provides students with practical and field-related skills in Agronomy (field crop production and soil management). Students will focus on techniques and knowledge necessary to efficiently and economically manage soils, crops and other farm resources with additional emphasis on pest management and commodity marketing. Courses stress the skills and information needed to work with current production technologies such as seed traits, crop protection chemicals, and fertilizers to improve yield and productivity.

### **HORTICULTURE:**

This option prepares students to enter the horticultural industry by providing a broad background in courses related to production and physiology of horticultural crops. Additional courses in pest management and business are required. Graduates may work as orchard, greenhouse, garden center, nursery or farm managers, with horticultural and landscape service providers, suppliers, and brokers, with cooperative extension and other government and non-governmental agencies and public and private gardens, or continue with graduate studies.

### **PLANT SCIENCE:**

This option emphasizes the application of the biological sciences to problem-solving in agronomic and horticultural ecosystems. Topic areas include plant biology, plant pathology, plant microbiology, plant biotechnology, plant-insect interactions, horticulture, crop science, plant ecology, and bioenergy. Graduates may find employment in industry, government and academic research programs as technicians and research assistants, or pursue graduate degrees.

### **PLANT GENETICS & BIOTECHNOLOGY:**

This option is a combination of basic science and technology-based classes designed for students who are seeking careers in agricultural sciences, plant breeding, plant molecular genetics and plant biotechnology based industries. It provides students with maximum flexibility in selecting a program of study suited to their needs and to achieve professional goals related to advanced degrees or immediate job placement in the industry. The option provides theoretical and practical skills of plant genetic manipulation relevant to plant biotechnology, plant breeding and genome research and prepares students for employment in industry or academia or pursue graduate degrees.

## Recommended Academic Plan for Agroecology Option- University Park Campus

Semester 1		Credits	Semester 2		Credits
<i>BIOL 110 – Basic Concepts and Biodiversity ( GN)</i>		4	<i>CHEM 110 – Chemical Principles I (GN)</i>		3
AG 150S – First year seminar		2	<i>CHEM 111 – Experimental Chemistry I (GN)</i>		1
<i>ENGL 015 – Rhetoric and Composition (GWS)</i>		3	AGECO 295 – Agroecology Internship		1
<i>MATH 022 – College Algebra II and Analytic Geometry OR</i> <i>MATH 026, 040, 041, 110, 140 (GQ)</i>		3-5	<b><i>SOILS 101 – Introductory Soil Science (GN)</i></b>		3
			SOILS 102 – Introductory Soil Science Laboratory		1
<b><i>AGRO 028 – Principles of Crop Management OR</i></b> <b><i>HORT 101 – Horticultural Sciences(GN)</i></b>		3	<b>AGECO 201 – Introduction to Agroecology</b>		3
			<i>CAS 100 – Effective Speech (GWS)</i>		3
Total Credits:		15-17	Total Credits:		15
Semester 3		Credits	Semester 4		Credits
AGECO 121 – Plant Stress: It’s Not Easy Being Green (GN) OR BIOL 127 – Introduction to Plant Biology (GN)		3	ENT 313 – Introduction to Entomology		2
<i>ENG 202C – Effective Writing: Technical Writing (GWS) OR</i> <i>ENG 202D – Effective Writing: Business Writing (GWS)</i>		3	ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology		1
<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS),</i> <i>ECON 102 – Microeconomics Analysis and Policy (GS), OR</i> <i>ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>		3	Agroecology Selection (Note A) OR GEN ED – (GA, GH, GS)**		3
Agroecology Selection (Note A) OR GEN ED – (GA, GH, GS)**		3	Ethics Selection (Note B) ( GH or GS)		3
<i>STAT 200 – Elementary Statistics (GQ)OR</i> <i>STAT 240 – Intro to Biometry (GQ) OR</i> <i>STAT 250 – Intro to Biostatistics (GQ)</i>		3-4	SOILS 402 – Soil Nutrient Behavior and Management		3
			GEN ED (GHA)		1.5
Total Credits:		15-16	Total Credits:		13.5
Semester 5		Credits	Semester 6		Credits
<b>AGECO 457 – Principles of Integrated Pest Management</b>		3	Writing Across the Curriculum (Note E) OR SUPPORTING COURSE*		3-4
Production Selection (Note C)		3	Production Selection (Note C)		3
Plant Breeding/Genetics Selection (Note D) OR SUPPORTING COURSE*		3	Plant Breeding/Genetics Selection (Note D) OR SUPPORTING COURSE*		3
PPEM 405 – Microbe-Plant Interactions: Plant Disease and Biological Control		3	SOILS 401 – Soil Composition and Physical Properties		3
SUPPORTING COURSE*		3	GEN ED – (GA, GH, GS)**		3
GEN ED (GHA)		1.5			
Total Credits:		16.5	Total Credits:		15-16
Semester 7		Credits	Semester 8		Credits
Writing Across the Curriculum (Note E) OR SUPPORTING COURSE*		3-4	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>		3
AGECO/AGRO438 – Principles of Weed Management		4	SUPPORTING COURSES*		3
AGECO 495 – Agroecology Internship		1	SUPPORTING COURSES*		3
SUPPORTING COURSE*		3	GEN ED (GA, GH, GS) **		3
GEN ED (GA, GH, GS) **		3	ELECTIVES as needed to make 120 credits		4
Total Credits:		14-15	Total Credits:		16

**NOTES:**

- A (Agroecology Selection):** Select 3 credits from AGECO/METEO 122 (3)-Atmospheric Environment – Growing in the Wind, AGECO 134 (3)-Sustainable Agriculture Science and Policy, AGECO 144 (3)-Principles and Practices of Organic Agriculture, or AGECO 154 (2)-Principles of Agronomic Field Operations, or AGECO 496 (1)-Independent Studies in Agroecology
- B (Ethics Selection):** Select 3 credits from AG 160 GH (3)-Introduction to Ethics and Issues in Agriculture, PHIL 013 GH (3)-Philosophy, Nature, and the Environment, PHIL 103 GH (3)-Introduction to Ethics, or GEOG 030 GS:IL (3)-Geographic Perspectives on Sustainability and Human-Environment Systems
- C (Production Selection):** Select 6 credits from AGRO 423 (3)-Forage Crop Management, AGRO 425 (3)-Field Crop Management , HORT 202 (3)-Plant Propagation, HORT 315 (3)-Environmental Effects on Horticultural Crops, HORT 431 (3)-Small Fruit Culture, HORT 432 (3)-Deciduous Tree Fruits, HORT 433 (3)-Vegetable Crops, HORT 450 (3)-Greenhouse Management, or SOILS 418/AGECO418/AN SC 418 (3)-Nutrient Management in Ag.Systems
- D (Plant Breeding/Genetics Selection):** Select 3 credits from BIOL 222 (3)-Genetics or HORT 407 (3)-Plant Breeding
- E (Writing Across the Curriculum Selection):** Select 3-4 credits from AGRO 410W (4)-Physiology of Agricultural Crops, HORT 412W (3)-Post Harvest Physiology, or SOILS 412W (3)-Soil Ecology

\*These are courses from the “Approved List of Supporting Courses” for the Agroecology Option.

\*\*Students must take one course with a US and one course with an IL designation. These requirements should be fulfilled by selecting GH, GS and GA courses with the appropriate US/IL designation.

**Bold type** indicates courses requiring a quality grade of C or better. *Italics* indicate courses that satisfy both major and General Education requirements.

**Bold Italics** indicates courses requiring a quality grade of C or better and that satisfy both major and General Education requirements.

## Recommended Academic Plan for Agroecology Option – Commonwealth Campuses

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity (GN)</i>	4	<i>CHEM 110 – Chemical Principles I (GN)</i>	3
First year seminar	1-3	<i>CHEM 111 – Experimental Chemistry I (GN)</i>	1
<i>ENGL 015 – Rhetoric and Composition (GWS)</i>	3	Ethics Selection (Note B) (GS or GH)	3
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140 (GQ)</i>	3-5	ELECTIVE	3
GEN ED – (GA, GH, GS)**	3	GEN ED (GHA)	1.5
	3	GEN ED – (GA, GH, GS)**	3
Total Credits:	14-18	Total Credits:	14.5
Semester 3	Credits	Semester 4	Credits
<i>CAS 100 – Effective Speech (GWS)</i>	3	<i>ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)</i>	3
Agroecology Selection (Note A) OR GEN ED – (GA, GH, GS)**	3	ELECTIVE OR SUPPORTING COURSE*	3
GEN ED – (GA, GH, GS)**	3	ELECTIVE OR SUPPORTING COURSE*	4
<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>	3	GEN ED (GHA)	1.5
<i>STAT 200 – Elementary Statistics (GQ) OR STAT 240 – Intro to Biometry (GQ) OR STAT 250 – Intro to Biostatistics (GQ)</i>	3-4	GEN ED – (GA, GH, GS)**	3
Total Credits:	15-16	Total Credits:	14.5
Semester 5	Credits	Semester 6	Credits
PPEM 405 Microbe-Plant Interactions: Plant Disease and Biological Control	3	<b>AGECO 201 – Introduction to Agroecology</b>	3
Production Selection (Note C)	3	Production Selection (Note C)	3
<b><i>SOILS 101 – Introductory Soil Science (GN)</i></b>	3	Agroecology Selection (Note A) OR SUPPORTING COURSE*	3
SOILS 102 – Introductory Soil Science Laboratory	1	Writing Across the Curriculum (Note E) OR SUPPORTING COURSE*	3-4
<i>AGECO 121 – Plant Stress: It’s Not Easy Being Green (GN) OR BIOL 127 – Introduction to Plant Biology (GN)</i>	3	ENT 313 – Introduction to Entomology	2
<b><i>AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences (GN)</i></b>	3	ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
Total Credits:	16	Total Credits:	15-16
Semester 7	Credits	Semester 8	Credits
Writing Across the Curriculum (Note E) OR SUPPORTING COURSE*	3-4	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>	3
Plant Breeding/Genetics Selection (Note D) OR SUPPORTING COURSE*	3	Plant Breeding/Genetics Selection (Note D) OR SUPPORTING COURSE*	3
AGECO/AGRO 438 – Principles of Weed Management	4	SOILS 401 – Soil Composition and Physical Properties	3
<b>AGECO 457 – Principles of Integrated Pest Management</b>	3	SOILS 402 – Soil Nutrient Behavior and Management	3
AGECO 295 – Agroecology Internship	1	SUPPORTING COURSE*	3
		AGECO 495 Agroecology Internship	1
Total Credits:	14-15	Total Credits:	16

### NOTES:

- A (Agroecology Selection):** Select 3 credits from AGECO/METEO 122 (3)-Atmospheric Environment – Growing in the Wind, AGECO 134 (3)-Sustainable Agriculture Science and Policy, AGECO 144 (3)-Principles and Practices of Organic Agriculture, AGECO 154 (2)-Principles of Agronomic Field Operations, or AGECO 496 (1)-Independent Studies in Agroecology
- B (Ethics Selection):** Select 3 credits from AG 160 GH (3)-Introduction to Ethics and Issues in Agriculture, PHIL 013 GH (3)-Philosophy, Nature, and the Environment, PHIL 103 GH (3)-Introduction to Ethics or GEOG 030 GS:IL (3)-Geographic Perspectives on Sustainability and Human-Environment Systems
- C (Production Selection):** Select 6 credits from AGRO 423 (3)-Forage Crop Management, AGRO 425 (3)-Field Crop Management, HORT 202 (3)-Plant Propagation, HORT 315 (3)-Environmental Effects on Horticultural Crops, HORT 431 (3)-Small Fruit Culture, HORT 432 (3)-Deciduous Tree Fruits, HORT 433 (3) Vegetable Crops, HORT 450 (3)-Greenhouse Management, or SOILS 418/AGECO418/AN SC 418 (3)-Nutrient Management in Agricultural Systems
- D (Plant Breeding/Genetics Selection):** Select 3 credits from BIOL 222 (3)-Genetics or HORT 407 (3)-Plant Breeding
- E (Writing Across the Curriculum Selection):** Select 3-4 credits from AGRO 410W (4)-Physiology of Agricultural Crops, HORT 412W (3)-Post Harvest Physiology, or SOILS 412W (3)-Soil Ecology

\*These are courses from the “Approved List of Supporting Courses” for the Agroecology Option.

\*\*Students must take one course with a US and one course with an IL designation. These requirements should be fulfilled by selecting GH, GS and GA courses with the appropriate US/IL designation.

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## Recommended Academic Plan for Crop Production Option – University Park

Semester 1	Credits	Semester 2	Credits
<b>AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences (GN)</b>	3	<b>AGECO 201 – Introductory Agroecology</b>	3
		AGECO 295 – Agroecology Internship	1
AG 150S – First year seminar	2	CHEM 110 – Chemical Principles I (GN)	3
BIOL 110 – Basic Concepts and Biodiversity (GN)	4	CHEM 111 – Experimental Chemistry I (GN)	1
ENGL 015 – Rhetoric and Composition (GWS)	3	<b>SOILS 101 – Introductory Soil Science (GN)</b>	3
MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140 (GQ)	3-5	SOILS 102 – Introductory Soil Science Laboratory	1
		GEN ED – (GA, GH, GS)**	3
Total Credits:	15-17	Total Credits:	15
Semester 3	Credits	Semester 4	Credits
AGECO 154 – Principles of Agronomic Field Operations OR SUPPORTING COURSE*	2-3	Business Selection (Note B)	3
AGECO 121 – Plant Stress: It’s Not Easy Being Green (GN) OR BIOL 127 – Introduction to Plant Biology (GN)	3	ENT 313 – Introduction to Entomology	2
CAS 100 – Effective Speech (GWS)	3	ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)	3	Leadership Selection (Note C)	3
ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)	3	STAT 200 – Elementary Statistics (GQ) OR STAT 240 – Intro to Biometry (GQ) OR STAT 250 – Intro to Biostatistics (GQ)	3-4
		GEN ED – (GA, GH, GS)**	3
Ethics Selection (GH) (Note A)	3		
Total Credits:	17-18	Total Credits:	15-16
Semester 5	Credits	Semester 6	Credits
AGRO 423 – Forage Crop Management	3	AGRO 410W – Physiology of Agricultural Crops OR HORT 412W – Post Harvest Physiology OR SUPPORTING COURSE*	3-4
AGECO 429 – Crop Scouting	2		
AGECO/AGRO 438 – Principles of Weed Management	4	AGRO 425 – Field Crop Management	3
GEN ED – (GA, GH, GS)**	3	SOILS 401 – Soil Composition and Physical Properties	3
SUPPORTING COURSE*	3-4	SOILS 402 – Soil Nutrient Behavior and Management	3
		Special Interest Selection if not previously selected (Note D) OR SUPPORTING COURSE*	3-4
Total Credits:	15-16	Total Credits:	15-17
Semester 7	Credits	Semester 8	Credits
<b>AGECO 457 – Principles of Integrated Pest Management</b>	3	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>	3
AGECO 495 – Agroecology Internship OR AGRO 495 – Agronomy Internship	1	GEN ED—(GA, GH, GS)**	3
ELECTIVES	4	HORT 407 – Plant Breeding	3
PPEM 405 – Microbe-Plant Interactions: Plant Disease and Biological Control	3	SUPPORTING COURSES*	3-6
SOILS 403 – Soil Morphology Practicum OR SOILS 412W – Soil Ecology OR SUPPORTING COURSE*	2-3	GEN ED (GHA)	1.5
GEN ED (GHA)	1.5		
Total Credits:	14.5- 15.5	Total Credits:	13.5- 16.5

**Notes:**

- A (Ethics Selection):** Select 3 credits from AG 160 GH (3)-Introduction into Ethics and Issues in Agriculture, PHIL 013 GH (3)-Philosophy, Nature and the Environment, PHIL 103 GH (3)-Introduction to Ethics, or PHIL 132 GH (3)-Introduction to Bioethics
- B (Business Selection):** Select 3 credits from: AG BM 102 (3)-Economics of the Food System, AG BM 106 (3)-Agribusiness Problem Solving, AG BM 200 (3)-Introduction to Agribusiness Business Management, or AG BM 407 (3)-Farm Planning and Financial Management
- C (Leadership Selection):** Select 3 credits from AEE 201 GS (3)-Interpersonal Skills for Tomorrow’s Leaders, AEE 360 (3)-Leadership Development for Small Groups, AEE 460 (3)-Foundations of Leadership Development or AEE 465 (3)-Leadership Practices
- D (Special Interest Selection):** Select 3 to 4 credits from AN SC 201 (4)-Animal Science, GEOG 160 GS (3)-Mapping Our Changing World, SOILS 450 (3)-Environmental Geographic Information Systems or SOILS 418/AGECO418/AN SC 418 (3)-Nutrient Management in Agricultural Systems

\*These are courses from the “Approved List of Supporting Courses” for the Crop Production Option.

\*\*Students must take one course with a US and one course with an IL designation. These requirements should be fulfilled by selecting GH, GS, and GA courses with the appropriate US/IL designation.

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## Recommended Academic Plan for Crop Production Option – Commonwealth Campuses

Semester 1	Credits	Semester 2	Credits
MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140 (GQ)	3-5	CHEM 110 – Chemical Principles I (GN) CHEM 111 – Experimental Chemistry I (GN)	3 1
First year seminar	1-3	GEN ED – (GA, GH, GS)**	3
BIOL 110 – Basic Concepts and Biodiversity (GN)	4	Health & Physical Activity – (GHA)	3
ENGL 015 – Rhetoric and Composition (GWS)	3	ELECTIVE OR SUPPORTING COURSE*	4
ELECTIVE	3		
Total Credits:	14-18	Total Credits:	14
Semester 3	Credits	Semester 4	Credits
Ethics Selection (Note A)(GH)	3	ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)	3
AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)	3	STAT 200 – Elementary Statistics (GQ) OR STAT 240 – Intro to Biometry (GQ) OR STAT 250 – Intro to Biostatistics (GQ)	3-4
GEN ED – (GA, GH, GS)**	3	CAS 100 – Effective Speech (GWS)	3
GEN ED – (GA, GH, GS)**	3	ELECTIVE OR SUPPORTING COURSE*	3
ELECTIVE	3	<b>AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences (GN)</b>	3
Total Credits:	15	Total Credits:	15-16
Semester 5	Credits	Semester 6	Credits
AGECO 154 – Principles of Agronomic Field Operations OR SUPPORTING COURSE*	2	<b>AGECO 201 – Introductory Agroecology</b>	3
AGRO 423 – Forage Crop Management	3	AGRO 425 – Field Crop Management	3
AGECO/AGRO 438 – Principles of Weed Management	4	AGRO 410W – Physiology of Agricultural Crops OR HORT 412W – Post Harvest Physiology OR SOILS 412W-Soil Ecology OR SUPPORTING COURSE*	3-4
AGECO 121 – Plant Stress: It’s Not Easy Being Green (GN) OR BIOL 127 – Introduction to Plant Biology (GN)	3	ENT 313 – Introduction to Entomology	2
		ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
<b>SOILS 101 – Introductory Soil Science</b>	3	Special Interest Selection (Note D) OR SUPPORTING COURSE*	3-4
SOILS 102 – Introductory Soil Science Laboratory	1		
Total Credits:	16	Total Credits:	15-17
Semester 7	Credits	Semester 8	Credits
AGECO 429 – Crop Scouting	2	AGECO 295 – Agroecology Internship OR SUPPORTING COURSE*	1-3
<b>AGECO 457 – Principles of Integrated Pest Management</b>	3	<b>PLANT 461 – Emerging Issues in Plant Sciences</b>	3
Business Selection (Note B)	3	SOILS 401 – Soil Composition and Physical Properties	3
PPEM 405 – Microbe-Plant Interactions	3	SOILS 402 – Soil Nutrient Behavior and Management	3
Leadership Selection, if not previously selected (Note C) OR SUPPORTING COURSE*	3	HORT 407 – Plant Breeding	3
AGECO 495 – Agroecology Internship OR AGRO 495 – Agronomy Internship	1	Balance to meet 120 credits	4
Total Credits:	15	Total Credits:	17-19

**Notes:**

- A (Ethics Selection):** Select 3 credits from AG 160 GH (3)-Introduction into Ethics and Issues in Agriculture, PHIL 013 GH(3)-Philosophy, Nature and the Environment, PHIL 103 GH (3)-Introduction to Ethics, or PHIL 132 GH (3)-Introduction to Bioethics
- B (Business Selection):** Select 3 credits from: AG BM 102 (3)-Economics of the Food System, AG BM 106 (3)-Agribusiness Problem Solving, AG BM 200 (3)-Introduction to Agribusiness Business Management, or AG BM 407 (3)-Farm Planning and Financial Management
- C (Leadership Selection):** Select 3 credits from AEE 201 GS (3)-Interpersonal Skills for Tomorrow’s Leaders, AEE 360 (3)-Leadership Development for Small Groups, AEE 460 (3)-Foundations of Leadership Development or AEE 465 (3)-Leadership Practices
- D (Special Interest Selection):** Select 3 to 4 credits from AN SC 201 (4)-Animal Science, GEOG 160 GS (3)-Mapping Our Changing World, SOILS 450 (3)-Environmental Geographic Information Systems or SOILS 418/AGECO418/AN SC 418 (3)-Nutrient Management in Agricultural Systems

\*These are courses from “Approved List of Supporting Courses” for the Crop Production Option.

\*\*Students must take one course with a US and one course with an IL designation. These requirements should be fulfilled by selecting GH, GS and GA courses with the appropriate US/IL designation.

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## Recommended Academic Plan for Horticulture Option – University Park

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity (GN)</i>	4	<i>CHEM 110 – Chemical Principles I (GN)</i>	3
<i>AG 150S – First year seminar (S)</i>	2	<i>CHEM 111 – Experimental Chemistry I (GN)</i>	1
<i>ENGL 015 – Rhetoric and Composition or ENGL 030 Honors Freshman Composition (GWS)</i>	3	<b>HORT 202 – Plant Propagation</b>	3
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140 (GQ)</i>	3-5	<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>	3
<b>HORT 101 – Horticultural Sciences(GN)</b>	3	<i>CAS 100 – Effective Speech (GWS)</i>	3
Total Credits:	15-17	Total Credits:	16
Semester 3	Credits	Semester 4	Credits
<b><i>SOILS 101 – Introductory Soil Science (GN)</i></b>	3	HORT 232 – Horticultural Systematics	3
<i>ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)</i>	3	<b>HORT 315 – Environmental Effects on Horticultural Crops</b>	3
HORT Plant Materials or Production Selection (Note C)	3	ENT 313 – Introduction to Entomology	2
Humanities (GH)**	3	ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
<i>STAT 200 (GQ) – Elementary Statistics OR STAT 240 – Intro to Biometry (GQ) OR STAT 250 – Intro to Biostatistics (GQ)</i>	3-4	Business/Spanish Selection (Note A)	3-4
Health and Physical Activity (GHA)	1.5	General Arts (GA)**	3
Total Credits:	16.5-17.5	Total Credits:	15-16
Semester 5	Credits	Semester 6	Credits
HORT 420 – Plant Growth Regulators	3	<b>HORT 412W – Post-Harvest Physiology</b>	3
HORT 455 – Retail Horticulture Business Management	3	HORT Production Selection (Note B)	3
HORT 238 – Turf and Ornamental Weed Control OR AGRO 438 –Principles of Weed Management	3-4	Business/Spanish Selection (Note A)	3-4
HORT Production Selection (Note B)	3	General Arts (GA)**	3
ELECTIVE OR SUPPORTING COURSE	3	Social and Behavioral Sciences (GS)**	3
Total Credits:	15-16	Total Credits:	15-16
Semester 7	Credits	Semester 8	Credits
HORT 445 – Plant Ecology	3	HORT 402W – Plant Nutrition	3
PPEM 405 Microbe-Plant Interactions OR PPEM 300 – Horticultural Crop Diseases	3	HORT 407 – Plant Breeding	3
<b>AGECO 457 – Principles of Integrated Pest Management</b>	3	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>	3
Business/Spanish Selection (Note A)	3-4	Health and Physical Activity (GHA)	1.5
ELECTIVE OR SUPPORTING COURSE	3-6	HORT 495 Internship OR HORT 496 Independent Studies	1
		ELECTIVES OR SUPPORTING COURSES	1-6
Total Credits:	15-19	Total Credits:	12.5-17.5

**NOTES:**

- A (Business/Spanish Selection):** Select 9-10 credits from AG BM 407 (3)-Farm Planning and Financial Management, B LAW 243 (3)-Legal Environment of Business, B A 301 (3)- Finance, B A 303 (3)- Marketing, SPAN 001 (4)-Elementary Spanish I, SPAN 002 (4)-Elementary Spanish II, SPAN 003 (4)-Elementary Spanish III, or SPAN 105 (4)-Spanish for Students in the Field of Agricultural Sciences
- B (Horticulture Production Selection):** Select 6-7 credits from HORT 408 (4)-Landscape Plant Establishment and Maintenance, HORT 431 (3)-Small Fruit Culture, HORT 432 (3)-Deciduous Tree Fruits, HORT 433 (3)-Vegetable Crops, HORT 450 (3)-Greenhouse Management, or HORT 453 (3)-Flower Crop Production and Management
- C (Plant Materials or Production Selection):** select 3 credits from HORT 131 (3)-Herbaceous Perennial and Annual Identification, HORT 137 (3)-Ornamental Plant Materials, HORT 138 (3)-Ornamental Plant Materials, HORT 431 (3)-Small Fruit Culture, HORT 432(3)-Deciduous Tree Fruits, or HORT 433(3)-Vegetable Crops

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## Recommended Academic Plan for Horticulture Option – Commonwealth Campuses

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity (GN)</i>	4	<i>CHEM 110 – Chemical Principles I (GN)</i>	3
First year seminar (S)	1-3	<i>CHEM 111 – Experimental Chemistry I (GN)</i>	1
<i>ENGL 015 – Rhetoric and Composition or ENGL 030 Honors Freshman Composition (GWS)</i>	3	<i>CAS 100 – Effective Speech (GWS)</i>	3
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140 (GQ)</i>	3-5	<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>	3
Health and Physical Activity (GHA)	1.5	Social and Behavioral Sciences (GS)**	3
Total Credits:	12.5-16.5	Business/Spanish Selection (Note A)	3-4
<b>Semester 3</b>	<b>Credits</b>	<b>Semester 4</b>	<b>Credits</b>
Humanities (GH)**	3	Business/Spanish Selection (Note A)	3-4
<i>ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)</i>	3	Humanities (GH)**	3
Business/Spanish Selection (Note A)	3-4	General Arts (GA)**	3
General Arts (GA)**	3	Health and Physical Activity (GHA)	1.5
<i>STAT 200 (GQ) – Elementary Statistics OR STAT 240 – Intro to Biometry (GQ) OR STAT 250 – Intro to Biostatistics (GQ)</i>	3-4	ELECTIVE OR SUPPORTING COURSE	3
Total Credits:	15-17	Total Credits:	13.5-14.5
<b>Semester 5</b>	<b>Credits</b>	<b>Semester 6</b>	<b>Credits</b>
<i>SOILS 101 – Introductory Soil Science (GN)</i>	3	<b>HORT 202 – Plant Propagation</b>	3
<i>HORT 101 – Horticultural Sciences (GN)</i>	3	HORT 232 – Horticultural Systematics	3
HORT 420 – Plant Growth Regulators	3	<b>HORT 315 – Environmental Effects on Horticultural Crops</b>	3
HORT 455 – Retail Horticulture Business Management	3	ENT 313 – Introduction to Entomology	2
HORT 238 – Turf and Ornamental Weed Control OR AGRO 438 – Principles of Weed Management	3-4	ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
Total Credits:	15-16	HORT Production Selection (Note B)	3
<b>Semester 7</b>	<b>Credits</b>	<b>Semester 8</b>	<b>Credits</b>
HORT 445 – Plant Ecology	3	HORT 402W – Plant Nutrition	3
PPEM 405 Microbe-Plant Interactions OR PPPEM 300 – Horticultural Crop Diseases	3	HORT 407 – Plant Breeding	3
<b>AGECO 457 – Principles of Integrated Pest Management</b>	3	<b>HORT 412W – Post-Harvest Physiology</b>	3
HORT Plant Materials or Production Selection (Note C)	3	HORT 495 Internship OR HORT 496 Independent Studies	1
HORT Production Selection (Note B)	3	<b>AGECO/PLANT 461 Emerging Issues in Plant Sciences</b>	3
Total Credits:	15	ELECTIVES OR SUPPORTING COURSES	1
Total Credits:	15	Total Credits:	14

**NOTES:**

**A (Business/Spanish Selection):** Select 9-10 credits from AG BM 407 (3)-Farm Planning and Financial Management, B LAW 243 (3)-Legal Environment of Business, B A 301 (3)- Finance, B A 303 (3)- Marketing, SPAN 001 (4)-Elementary Spanish I, SPAN 002 (4)-Elementary Spanish II, SPAN 003 (4)-Elementary Spanish III, or SPAN 105 (4)-Spanish for Students in the Field of Agricultural Sciences

**B (Horticulture Production Selection):** Select 6-7 credits from HORT 408 (4)-Landscape Plant Establishment and Maintenance, HORT 431 (3)-Small Fruit Culture, HORT 432 (3)-Deciduous Tree Fruits, HORT 433 (3)-Vegetable Crops, HORT 450 (3)-Greenhouse Management, or HORT 453 (3)-Flower Crop Production and Management

**C (Plant Materials or Production Selection):** select 3 credits from HORT 131 (3)-Herbaceous Perennial and Annual Identification, HORT 137 (3)-Ornamental Plant Materials, HORT 138 (3)-Ornamental Plant Materials, HORT 431 (3)-Small Fruit Culture, HORT 432(3)-Deciduous Tree Fruits, or HORT 433(3)-Vegetable Crops

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## Recommended Academic Plan for Plant Science Option – University Park

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity</i> (GN)	4	<i>CHEM 110 – Chemical Principles I</i> (GN)	3
AG 150S –First year seminar (S)	2	<i>CHEM 111 – Experimental Chemistry I</i> (GN)	1
<i>AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences</i> (GN)	3	<b><i>SOILS 101 – Introductory Soil Science</i></b>	3
<i>ENGL 015 – Rhetoric and Composition</i>	3	GEN ED (GA)**	3
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140</i> (GQ)	3-5	GEN ED (GH)**	3
		<i>CAS 100 – Effective Speech</i> (GWS)	3
Total Credits:	15-17	Total Credits:	16
Semester 3	Credits	Semester 4	Credits
<i>CHEM 112 – Chemical Principles II</i> (GN)	3	<i>CHEM 210 – Fundamentals of Organic Chemistry I</i>	3
<i>CHEM 113-Experimental Chemistry II ( GN) OR CHEM 113B – Experimental Chemistry</i> (GN) II	1	Microbiology Selection (Note A)	4-6
GEN ED (GH)**	3	<i>STAT 200 – Elementary Statistics</i> (GQ) OR <i>STAT 240 – Introduction to Biostatistics</i> (GQ) OR <i>STAT 250 – Introduction to Biostatistics</i> (GQ)	3-4
<i>AG BM 101 – Economic Principles of Agribusiness Decision Making</i> (GS), <i>ECON 014 – Principles of Economics</i> (GS), <i>ECON 102 – Microeconomics Analysis and Policy</i> (GS), OR <i>ECON 104 – Introductory Macroeconomic Analysis and Policy</i> (GS)	3	<i>ENG 202C – Effective Writing: Technical Writing</i> (GWS) OR <i>ENG 202D – Effective Writing: Business Writing</i> (GWS)	3
<i>PHYS 250 Introductory Physics</i> (GN)	4	GEN ED (GA)**	3
<b><i>BIOL 127 – Plant Biology</i></b> (GN)	3		
Total Credits:	17	Total Credits:	16-19
Semester 5	Credits	Semester 6	Credits
General Plant Science Selection (Note F)	3-4	Plant Microbiology & Entomology Selection (Note E)	3-4
GEN ED (GS)**	3	Writing Across the Curriculum Selection (Note B)	3-4
<i>CHEM 212 – Fundamentals of Organic Chemistry II</i>	3	GEN ED (GHA)	3
ELECTIVE	3	ELECTIVE	3
<b><i>AGECO 457 Principles of Integrated Pest Management</i></b>	3	<i>CHEM 213B Organic Chemistry Laboratory</i>	2
Total Credits:	15-16	Total Credits:	14-16
Semester 7	Credits	Semester 8	Credits
<b><i>PPEM 405 – Plant Microbe Interactions</i></b>	3	General Plant Science Selection (Note F)	3
<i>BIOL 222 – Genetics</i>	3	<i>ENT 313 – Introduction to Entomology</i>	2
Plant Ecology, Evolution & Systematics Selection (Note C)	3-4	<i>ENT 314 – Management of Insect Pests of Ornamentals</i> or <i>ENT 316 – Field Crops Entomology</i>	1
<i>AGECO 495, AGRO 495, HORT 495, or 496</i>	1	Plant Genetics & Biotechnology Selection (Note D)	3
ELECTIVE	3	ELECTIVES (as needed for 120 credits for degree)	2-3
		<b><i>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</i></b>	3
Total Credits:	13-14	Total Credits:	14-15

### Notes:

- A (Microbiology, Molecular Biology & Biochemistry Selection):** Select 4-6 credits from *BIOL 230W GN* (4)-Biology: Molecules and Cells, or *BIOL 240W GN* (4)-Biology: Function and Development of Organism, or *BMB 211* (3)-Elementary Biochemistry and *BMB 212* (1) -Elementary Biochemistry Laboratory, or *MICRB 201* (3)-Introductory Microbiology and *MICRB 202* (2) -Introductory Microbiology Laboratory, or *MICRB 251* (3)-Molecular and Cell Biology I and *MICRB 252* (3) -Molecular and Cell Biology II
- B (Writing Across the Curriculum Selection):** Select 3-4 credits from *AGRO 410W* (3-4)-Physiology of Agricultural Crops, *HORT 412W* (3)-Post-Harvest Physiology, or *SOILS 412W* (3)-Soil Ecology
- C (Plant Ecology, Evolution & Systematics Selection):** Select 3-4 credits from *BIOL 412* (3)-Ecology of Infectious Diseases, *BIOL 414* (3)-Taxonomy of seed Plants, *BIOL 427* (3)-Evolution, *BIOL 428* (3)-Population Genetics, *BIOL 436* (3)-Population Ecology and Global Climate Change, *BIOL 448* (3)-Ecology of Plant Reproduction, *ENT/VB SC 402W*(3)-Biology of Animal Parasites, *ENT 420* (3)-Introduction to Population Dynamics, *HORT 445* (3)-Plant Ecology, or *PPEM 425* (4) -Biology of Fungi
- D (Plant Genetics & Biotechnology Selection)** Select 3 credits from *AGRO 460* (3) Advance and Applications of Plant Biotechnology, *BIOL 439* (3)-Population Ecology and Global Climate Change, *HORT407* (3)-Plant Breeding, or *HORT 459* (3)-Plant Tissue Culture and Biotechnology
- E (Plant Microbiology & Entomology Selection):** Select 3-4 credits from *ENT 402W* (3)-Biology of Animal Parasites, *ENT 410* (3)-Insect Structure and Function, *PPEM 416* (3)-Plant Virology: Molecules to Populations, or *PPEM 425* (4)-Biology of Fungi
- F (General Plant Science Selection):** Select 6-7 credits from *AGRO 410W* (4)-Physiology of Agricultural Crops, *AGRO 460* (3)-Human Genetics, *BIOL 407* (3)-Plant Developmental Anatomy, *BIOL 424* (3)-Seeds of Change: The Uses of Plants, *BIOL 441* (3)-Plant Physiology, *HORT 402W* (3)-Plant Nutrition, *HORT 407* (3)-Plant Breeding, *HORT 412W* (3)-Post-Harvest Physiology, *HORT 420*-Plant Growth Regulators, *PPEM 417* (3)-Phytobacteriology or *PPEM/ERM 430*-Air Pollution Impacts to Terrestrial Ecosystems

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## Recommended Academic Plan for Plant Science Option – Commonwealth Campuses

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity(GN)</i>	4	<i>CHEM 110 – Chemical Principles I (GN)</i>	3
First year seminar (S)	1-3	<i>CHEM 111 – Experimental Chemistry I (GN)</i>	1
GEN ED (GS)**	3	ELECTIVE	3
<i>ENGL 015 – Rhetoric and Composition (GWS)</i>	3	GEN ED (GHA)	1.5
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 140 (GQ)</i>	3-5	GEN ED (GA)**	3
		GEN ED (GH)**	3
Total Credits:	14-18	Total Credits:	14.5
Semester 3	Credits	Semester 4	Credits
<i>CHEM 112 – Chemical Principles II (GN)</i>	3	<i>CHEM 210 –Organic Chemistry I</i>	3
<i>CHEM 113-Experimental Chemistry II ( GN) OR CHEM 113B – Experimental Chemistry (GN) II</i>	1	<i>ENGL 202C – Effective Writing: Technical Writing (GWS)</i>	3
<i>CAS 100 – Effective Speech (GWS)</i>	3	GEN ED (GH)**	3
<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>	3	<i>STAT 200 – Elementary Statistics (GQ) OR STAT 240 – Introduction to Biostatistics (GQ) OR STAT 250 – Introduction to Biostatistics (GQ)</i>	3-4
GEN ED (GA)**	3	ELECTIVE	3
<i>PHYS 250 Introductory Physics (GN)</i>	4	GEN ED (GHA)	1.5
Total Credits:	17	Total Credits:	16.5-17.5
Semester 5	Credits	Semester 6	Credits
<b>AGECO 457 Principles of Integrated Pest Management</b>	3	General Plant Science Selection (Note F)	3
<b>PPEM 405 – Plant Microbe Interactions</b>	3	Writing Across the Curriculum Selection (Note B)	3-4
<i>CHEM 212 –Organic Chemistry II</i>	3	<i>CHEM 213B Organic Chemistry Laboratory</i>	2
<b><i>BIOL 127 – Plant Biology (GN)</i></b>	3	Microbiology Selection (Note A)	4-6
<i>AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences (GN)</i>	3	<b><i>SOILS 101 – Introductory Soil Science (GN)</i></b>	3
Total Credits:	15	Total Credits:	15-18
Semester 7	Credits	Semester 8	Credits
Plant Microbiology & Entomology Selection (Note E)	3-4	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>	3
<i>BIOL 222 – Genetics</i>	3	<i>ENT 313 – Introduction to Entomology</i>	2
Plant Ecology, Evolution & Systematics Selection (Note C)	3-4	<i>ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology</i>	1
AGECO 495, AGRO 495, HORT 495, or 496	1	Plant Genetics & Biotechnology Selection (Note D)	3
General Plant Science Selection (Note F)	3	ELECTIVES (as needed for 120 credits for degree)	6
Total Credits:	13-15	Total Credits:	15

**Notes:**

- A (Microbiology, Molecular Biology & Biochemistry Selection):** Select 4-6 credits from BIOL 230W GN (4)-Biology: Molecules and Cells, or BIOL 240W GN (4)-Biology: Function and Development of Organism, or BMB 211 (3)-Elementary Biochemistry and BMB 212 (1) -Elementary Biochemistry Laboratory, or MICRB 201 (3)-Introductory Microbiology and MICRB 202 (2) -Introductory Microbiology Laboratory, or MICRB 251 (3)-Molecular and Cell Biology I and MICRB 252 (3)-Molecular and Cell Biology II
- B (Writing Across the Curriculum Selection):** Select 3-4 credits from AGRO 410W (4)-Physiology of Agricultural Crops, HORT 412W\* (3)-Post-Harvest Physiology, or SOILS 412W (3)-Soil Ecology
- C (Plant Ecology, Evolution & Systematics Selection):** Select 3-4 credits from BIOL 412 (3)-Ecology of Infectious Diseases, BIOL 414 (3)-Taxonomy of seed Plants, BIOL 427 (3)-Evolution, BIOL 428 (3)-Population Genetics, BIOL 436 (3)-Population Ecology and Global Climate Change, BIOL 448 (3)-Ecology of Plant Reproduction, ENT/VB SC 402W (3)-Biology of Animal Parasites, ENT 420 (3)-Introduction to Population Dynamics, HORT 445 (3)-Plant Ecology, or PPEM 425 (4)\*-Biology of Fungi
- D (Plant Genetics & Biotechnology Selection)** Select 3 credits from AGRO 460 (3) Advance and Applications of Plant Biotechnology, BIOL 439 (3)-Population Ecology and Global Climate Change, HORT407 (3)-Plant Breeding, or HORT 459 (3)-Plant Tissue Culture and Biotechnology
- E (Plant Microbiology & Entomology Selection):** Select 3-4 credits from ENT 402W\* (3)-Biology of Animal Parasites, ENT 410 (3)-Insect Structure and Function, PPEM 416 (3)-Plant Virology: Molecules to Populations, PPEM 417 (3)-Phylobacteriology, or PPEM 425 (4)-Biology of Fungi
- F (General Plant Science Selection):** Select 6-7 credits from AGRO 410W (4)-Physiology of Agricultural Crops, AGRO 460 (3)-Human Genetics, BIOL 407 (3)-Plant Developmental Anatomy, BIOL 424 (3)-Seeds of Change: The Uses of Plants, BIOL 441 (3)-Plant Physiology, HORT 402W (3)-Plant Nutrition, HORT 407 (3)-Plant Breeding, HORT 412W (3)-Post-Harvest Physiology, HORT 420-Plant Growth Regulators, PPEM 417 (3)-Phylobacteriology or PPEM/ERM 430-Air Pollution Impacts to Terrestrial Ecosystems

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# Recommended Academic Plan for Plant Genetics and Biotechnology Option – University Park

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity (GN)</i>	4	<i>CHEM 110 – Chemical Principles I (GN)</i>	3
<i>AG 150S –First year seminar (S)</i>	2	<i>CHEM 111 – Experimental Chemistry I (GN)</i>	1
<i>AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences (GN)</i>	3	<b><i>SOILS 101 – Introductory Soil Science</i></b>	3
<i>ENGL 015 – Rhetoric and Composition</i>	3	GEN ED (GA)**	3
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 111, 140 or 140B (GQ)</i>	3-5	GEN ED (GH)**	3
		<i>CAS 100 – Effective Speech (GWS)</i>	3
Total Credits:	15-17	Total Credits:	16
Semester 3	Credits	Semester 4	Credits
<i>BIOL 222 – Genetics</i>	3	<i>CHEM 210 – Fundamentals of Organic Chemistry I</i>	3
<i>CHEM 112 – Chemical Principles II (GN)</i>	3	Microbiology Molecular Biology & Biochemistry Selection (Note A)	4-6
<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>	3	<i>STAT 200 – Elementary Statistics (GQ) OR STAT 240 – Introduction to Biostatistics (GQ) OR STAT 250 – Introduction to Biostatistics (GQ)</i>	3-4
<i>PHYS 250 Introductory Physics (GN)</i>	4	GEN ED (GHA)	1.5
<b><i>BIOL 127 – Plant Biology (GN)</i></b>	3	GEN ED (GA)**	3
Total Credits:	16	Total Credits:	14.5-17.5
Semester 5	Credits	Semester 6	Credits
GEN ED (GS)**	3	AGRO 410W - Physiology of Agricultural Crops	4
<i>CHEM 212 – Fundamentals of Organic Chemistry II</i>	3		
Production Selection (Note F)	3	HORT/BIOTC 459 -Plant Tissue Culture and Biotechnology	3
<b>AGECO 457 Principles of Integrated Pest Management</b>	3	<i>ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)</i>	3
HORT 407 – Plant Breeding	3	ENT 313 – Introduction to Entomology	2
		ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
		ELECTIVE	3
Total Credits:	15	Total Credits:	16
Semester 7	Credits	Semester 8	Credits
<b>PPEM 405 – Plant Microbe Interactions</b>	3	General Plant Science Selection (Note E)	3-4
<i>BMB 400 – Molecular Biology of the Gene</i>	2	Plant Microbiology & Entomology Selection (Note D)	3
Plant Ecology, Evolution & Systematics Selection (Note B)	3-4		
AGECO 495, AGRO495, HORT 495, HORT 496 Internship or Independent Study	1	AGRO/BIOTC 460 – Advances and Applications of Plant Biotechnology	3
GEN ED (GH)**	3	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>	3
Plant Genetics & Biotechnology Selection (NOTE C)	2-3	GEN ED (GHA)	1.5
Total Credits:	14-16	Total Credits:	13.5-14.5

**Notes:**

- A (Microbiology, Molecular Biology & Biochemistry Selection):** Select 4-6 credits from: BIOL 230W GN (4)-Biology: Molecules and Cells, or BIOL 240W GN (4)-Biology: Function and Development of Organism, or BMB 211 (3)-Elementary Biochemistry and BMB 212 (1)-Elementary Biochemistry Laboratory, or MICRB 201 (3)-Introductory Microbiology and MICRB 202 (2)-Introductory Microbiology Laboratory, or MICRB 251(B M B 251) (3)-Molecular and Cell Biology I and MICRB 252 (3)-Molecular and Cell Biology II
- B (Plant Ecology, Evolution & Systematics Selection):** Select 3-4 credits from BIOL 412 (3)-Ecology of Infectious Diseases, BIOL 414 (3)-Taxonomy of seed Plants, BIOL 427 (3)-Evolution, BIOL 428 (3)-Population Genetics, BIOL 436 (3)-Population Ecology and Global Climate Change, BIOL 448 (3)-Ecology of Plant Reproduction, ENT/VB SC 402W(3)-Biology of Animal Parasites, ENT 420 (3)-Introduction to Population Dynamics, HORT 445 (3)-Plant Ecology, or PPEM 425 (4) -Biology of Fungi
- C (Plant Genetics & Biotechnology Selection)** Select 2-3 credits from BIOL 439 (3)-Population Ecology and Global Climate Change, IBIOS 571 (2) –Current Issues in Biotechnology, BIOTC 479 (3) – Methods in Biofermentation, HORT 497B (3) – Current Topics in Plant Breeding, IBIOS 593 (3)-Molecular Biology Lab
- D (Plant Microbiology & Entomology Selection):** Select 3-4 credits from ENT 402W (3)-Biology of Animal Parasites, ENT 410 (3)-Insect Structure and Function, PPEM 416 (3)-Plant Virology: Molecules to Populations, or PPEM 425 (4)-Biology of Fungi
- E (General Plant Science Selection):** Select 3-4 credits from BIOL 407 (3)-Plant Developmental Anatomy, BIOL 424 (3)-Seeds of Change: The Uses of Plants, BIOL 441 (3)-Plant Physiology, HORT 402W (3)-Plant Nutrition, HORT 412W (3)-Post-Harvest Physiology, HORT 420-Plant Growth Regulators, PPEM 417 (3)-Phylobacteriology or PPEM/ERM 430-Air Pollution Impacts to Terrestrial Ecosystems, IBIOS 591 (1) – Ethics in the Life Sciences
- F (Production Selection):** Select 3 credits from AGRO 423 (3)-Forage Crop Management, AGRO 425 (3)-Field Crop Management , HORT 202 (3)-Plant Propagation, HORT 315 (3)-Environmental Effects on Horticultural Crops, HORT 431 (3)-Small Fruit Culture, HORT 432 (3)-Deciduous Tree Fruits, HORT 433 (3)-Vegetable Crops, HORT 450 (3)-Greenhouse Management, or SOILS 418/AGECO418/AN SC 418 (3)-Nutrient Management in Ag.Systems

\*\*Students must take one course with a US and one course with an IL designation. These requirements should be fulfilled by selecting GH, GS and GA courses with the appropriate US/IL designation.

**Bold type** indicates courses requiring a quality grade of C or better.

*Italics* indicate courses that satisfy both major and General Education requirements.

**Bold Italics** indicates courses requiring a quality grade of C or better and that satisfy both major and General Education requirements.

# Recommended Academic Plan for Plant Genetics and Biotechnology Option – Commonwealth Campuses

Semester 1	Credits	Semester 2	Credits
<i>BIOL 110 – Basic Concepts and Biodiversity (GN)</i>	4	<i>CHEM 110 – Chemical Principles I (GN)</i>	3
First year seminar (S) (if required)	1-3	<i>CHEM 111 – Experimental Chemistry I (GN)</i>	1
GEN ED (GS)**	3	GEN ED (GA)**	3
<i>ENGL 015 – Rhetoric and Composition (GWS)</i>	3	GEN ED (GH)**	3
<i>MATH 022 – College Algebra II and Analytic Geometry OR MATH 026, 040, 041, 110, 111, 140, or 140B (GQ)</i>	3-5	<i>CAS 100 – Effective Speech (GWS)</i>	3
Total Credits:	14-18	Total Credits:	13
Semester 3	Credits	Semester 4	Credits
<i>CHEM 112 – Chemical Principles II (GN)</i>	3	<i>ENG 202C – Effective Writing: Technical Writing (GWS) OR ENG 202D – Effective Writing: Business Writing (GWS)</i>	3
GEN ED (GH)**	3	Microbiology Molecular Biology & Biochemistry Selection (Note A)	4-6
<i>AG BM 101 – Economic Principles of Agribusiness Decision Making (GS), ECON 014 – Principles of Economics (GS), ECON 102 – Microeconomics Analysis and Policy (GS), OR ECON 104 – Introductory Macroeconomic Analysis and Policy (GS)</i>	3	<i>STAT 200 – Elementary Statistics (GQ) OR STAT 240 – Introduction to Biostatistics (GQ) OR STAT 250 – Introduction to Biostatistics (GQ)</i>	3-4
<i>PHYS 250 Introductory Physics (GN)</i>	4	GEN ED (GHA)	1.5
GEN ED (GHA)	1.5	GEN ED (GA)**	3
Total Credits:	15.5	Total Credits:	14.5-17.5
Semester 5	Credits	Semester 6	Credits
BIOL 222 – Genetics	3	AGRO 410W - Physiology of Agricultural Crops	4
CHEM 210 – Fundamentals of Organic Chemistry I	3	HORT/BIOTC 459 -Plant Tissue Culture and Biotechnology	3
AGRO 028 – Principles of Crop Management OR HORT 101 – Horticultural Sciences (GN)	3	CHEM 212 – Fundamentals of Organic Chemistry II	3
<b>PPEM 405 – Plant Microbe Interactions</b>	3	<b>SOILS 101 – Introductory Soil Science (GN)</b>	3
<b>BIOL 127 – Plant Biology (GN)</b>	3	ENT 313 – Introduction to Entomology	2
Production Selection (Note F)	3	ENT 314 – Management of Insect Pests of Ornamentals or ENT 316 – Field Crops Entomology	1
Total Credits:	18	Total Credits:	16
Semester 7	Credits	Semester 8	Credits
<b>AGECO 457 Principles of Integrated Pest Management</b>	3	General Plant Science Selection (Note E)	3-4
BMB 400 – Molecular Biology of the Gene	2	Plant Microbiology & Entomology Selection (Note D)	3
Plant Ecology, Evolution & Systematics Selection (Note B)	3-4	AGRO/BIOTC 460 – Advances and Applications of Plant Biotechnology	3
AGECO 495, AGRO495, HORT 495, HORT 496 Internship or Independent Study	1	ELECTIVES (as needed for 120 credits for degree)	3-4
HORT 407 – Plant Breeding	3	<b>AGECO/PLANT 461 – Emerging Issues in Plant Sciences</b>	3
Plant Genetics & Biotechnology Selection (Note C)	2-3		
Total Credits:	14-16	Total Credits:	15-17

## Notes:

- A (Microbiology, Molecular Biology & Biochemistry Selection):** Select 4-6 credits from: BIOL 230W GN (4)-Biology: Molecules and Cells, or BIOL 240W GN (4)-Biology: Function and Development of Organism, or BMB 211 (3)-Elementary Biochemistry and BMB 212 (1)-Elementary Biochemistry Laboratory, or MICRB 201 (3)-Introductory Microbiology and MICRB 202 (2) -Introductory Microbiology Laboratory, or MICRB 251(B M B 251) (3)-Molecular and Cell Biology I and MICRB 252 (3)-Molecular and Cell Biology II
- B (Plant Ecology, Evolution & Systematics Selection):** Select 3-4 credits from BIOL 412 (3)-Ecology of Infectious Diseases, BIOL 414 (3)-Taxonomy of seed Plants, BIOL 427 (3)-Evolution, BIOL 428 (3)-Population Genetics, BIOL 436 (3)-Population Ecology and Global Climate Change, BIOL 448 (3)-Ecology of Plant Reproduction, ENT/VB SC 402W(3)-Biology of Animal Parasites, ENT 420 (3)-Introduction to Population Dynamics, HORT 445 (3)-Plant Ecology, or PPEM 425 (4) -Biology of Fungi
- C (Plant Genetics & Biotechnology Selection)** Select 2-3 credits from BIOL 439 (3)-Population Ecology and Global Climate Change, IBIOS 571 (2) –Current Issues in Biotechnology, BIOTC 479 (3) – Methods in Biofermentation, HORT 497B (3) – Current Topics in Plant Breeding, IBIOS 593 (3)-Molecular Biology Lab
- D (Plant Microbiology & Entomology Selection):** Select 3-4 credits from ENT 402W (3)-Biology of Animal Parasites, ENT 410 (3)-Insect Structure and Function, PPEM 416 (3)-Plant Virology: Molecules to Populations, or PPEM 425 (4)-Biology of Fungi
- E (General Plant Science Selection):** Select 3-4 credits from BIOL 407 (3)-Plant Developmental Anatomy, BIOL 424 (3)-Seeds of Change: The Uses of Plants, BIOL 441 (3)-Plant Physiology, HORT 402W (3)-Plant Nutrition, HORT 412W (3)-Post-Harvest Physiology, HORT 420-Plant Growth Regulators, PPEM 417 (3)-Phytobacteriology or PPEM/ERM 430-Air Pollution Impacts to Terrestrial Ecosystems, IBIOS 591 (1) – Ethics in the Life Sciences
- F (Production Selection):** Select 3 credits from AGRO 423 (3)-Forage Crop Management, AGRO 425 (3)-Field Crop Management , HORT 202 (3)-Plant Propagation, HORT 315 (3)-Environmental Effects on Horticultural Crops, HORT 431 (3)-Small Fruit Culture, HORT 432 (3)-Deciduous Tree Fruits, HORT 433 (3)-Vegetable Crops, HORT 450 (3)-Greenhouse Management, or SOILS 418/AGECO418/AN SC 418 (3)-Nutrient Management in Ag.Systems

\*\*Students must take one course with a US and one course with an IL designation. These requirements should be fulfilled by selecting GH, GS and GA courses with the appropriate US/IL designation.

**Bold type** indicates courses requiring a quality grade of C or better.

*Italics* indicate courses that satisfy both major and General Education requirements

**Bold Italics** indicates courses requiring a quality grade of C or better and that satisfy both major and General Education requirements

Student: \_\_\_\_\_  
 PSU ID: \_\_\_\_\_  
 Advisor: \_\_\_\_\_

The Pennsylvania State University  
**PLANT SCIENCES MAJOR**  
**Agroecology Option**  
 120 Credits Required

Minor: \_\_\_\_\_  
 Program Year: \_\_\_\_\_  
 Expected Graduation Date: \_\_\_\_\_

**REQUIREMENTS FOR THE MAJOR**

Course	Cr.	Grade	Sem.	Course	Cr.	Grade	Sem.
<b>Prescribed Courses (64-66 credits)</b>				<b>Supporting Courses (36-39 credits)</b>			
AG 150S or Freshman Seminar	(1-3)	_____	_____	<u>Agroecology Selection (select 3 credits)</u>			
AGRO 028 or HORT 101*	(3)	_____	_____	AGECO 122, AGECO 134, AGECO 144,	(3)	_____	_____
AGECO 121 or BIOL 127	(3)	_____	_____	AGECO 154, AGECO 296			
AGECO 201*	(3)	_____	_____				
AGECO 295	(1)	_____	_____	<u>Ethics Selection (select 3 credits)</u>	(3)	_____	_____
AGECO 457*	(3)	_____	_____	AG 160, PHIL 013, PHIL 103 GEOG 030			
AGECO 461*	(3)	_____	_____				
AGECO 495	(1)	_____	_____	<u>Production Selection (select 6 credits)</u>			
AGRO 438/HORT 238	(3)	_____	_____	AGRO 423, AGRO 425, HORT 202,			
BIOL 110	(4)	_____	_____	HORT 315, HORT 431, HORT 432,	(3)	_____	_____
CAS 100	(3)	_____	_____	HORT 433, HORT 450, SOILS 418	(3)	_____	_____
CHEM 110*	(3)	_____	_____				
CHEM 111	(1)	_____	_____	<u>Plant Breeding/Genetics Selection</u>			
ECON 102/104/AG BM 101	(3)	_____	_____	(select 3 credits)			
ENGL 015 or 30	(3)	_____	_____	HORT 407, BIOL 222			
ENGL 202C or ENGL 202D	(3)	_____	_____		(3)	_____	_____
ENT 313	(2)	_____	_____				
ENT 316	(1)	_____	_____				
MATH 022 (or higher)	(3)	_____	_____	Writing Across the Curriculum			
PPEM 300 or 405	(3)	_____	_____	(select 3-4 credits)			
SOILS 101*	(3)	_____	_____	AGRO 410W, HORT 412W,			
SOILS 102	(1)	_____	_____	SOILS 412W			
SOILS 401	(3)	_____	_____		(3-4)	_____	_____
SOILS 402	(3)	_____	_____				
STAT 200/240/250	(3-4)	_____	_____	<u>Supporting courses</u>			
				(select 18-20 credits)			
				_____			
				_____			
				_____			
				_____			
				_____			
				_____			

\*C-required

Last Updated 4/2014

**GENERAL EDUCATION**

Course	Cr.	Grade	Sem.
<b>Skills (15 credits)</b>			
<u>Communications</u> (GWS 9 credits) [satisfied by 9 credits from ENGL 015 or 30, ENGL 202C/D and CAS 100 in prescribed courses]			
<u>Quantification</u> (GQ 6 credits) [satisfied by 6 credits from MATH 022 (or higher) and STAT 200/240/250]			
<b>Knowledge Domain (30 credits)</b>			
<u>Natural Sciences</u> (GN 9 credits) [satisfied by 9 credits from BIOL 110, CHEM 110, CHEM 111, and SOILS 101 in Prescribed Courses]			
<u>Arts</u> (GA 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Humanities</u> (GH 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Social &amp; Behavioral Sciences</u> (GS 6 cr) [3 credits satisfied from ECON 102/ECON 104/AG BM 101			
_____	(3)	_____	_____
<u>Health &amp; Physical Activity</u> (GHA 3 cr)			
_____		_____	_____
_____		_____	_____
<b>US Cultures and International Cultures Requirement</b> (3 credits US and 3 credits IL) [can be satisfied by GA/US, GA/IL, GH/US or GH/IL]			
_____	(IL)	_____	_____
_____	(US)	_____	_____



Student: \_\_\_\_\_  
 PSU ID: \_\_\_\_\_  
 Advisor: \_\_\_\_\_

The Pennsylvania State University  
**PLANT SCIENCES MAJOR**  
**Crop Production Option**  
 120 Credits Required

Minor: \_\_\_\_\_  
 Program Year: \_\_\_\_\_  
 Expected Graduation Date: \_\_\_\_\_

**REQUIREMENTS FOR THE MAJOR**

Course	Cr.	Grade	Sem.	Course	Cr.	Grade	Sem.
<b>Prescribed Courses (76-80 credits)</b>				<b>Supporting Courses (26-30 credits)</b>			
AG 150S or Freshman Seminar	(1-3)	_____	_____	<u>Business Selection (select 3 credits)</u>			
AGRO 028 or HORT 101*	(3)	_____	_____	AG BM 102, AG BM 10g, AG BM 200,	(3)	_____	_____
AGECO 121 or BIOL 127	(3)	_____	_____	AG BM 407			
AGECO 154	(3)	_____	_____				
AGECO 201*	(3)	_____	_____	<u>Ethics Selection (select 3 credits)</u>	(3)	_____	_____
AGECO 295	(1)	_____	_____	AG 160, PHIL 013, PHIL 103 PHIL 132			
AGECO 429	(2)	_____	_____				
AGECO 457*	(3)	_____	_____	<u>Leadership Selection (select 3 credits)</u>			
AGECO 461*	(3)	_____	_____	AEE 201, AEE 360, AEE 460, AEE 465			
AGECO/AGRO 495	(1)	_____	_____	_____	(3)	_____	_____
AGRO 410W or HORT 412W	(3-4)	_____	_____				
AGRO 423	(3)	_____	_____	Special Interest Selection			
AGRO 425	(3)	_____	_____	<u>(select 3-4 credits)</u>			
BIOL 110	(4)	_____	_____	AN SC 201, AN SC 306, AN SC 308,			
CAS 100	(3)	_____	_____	AN SC 309, AN SC 310, AN SC 311,			
CHEM 110	(3)	_____	_____	GEOG 160, SOILS 418, SOILS 450	(3-4)	_____	_____
CHEM 111	(1)	_____	_____				
ECON 102/104/AG BM 101	(3)	_____	_____	<u>Supporting courses</u>			
ENGL 015 or 30	(3)	_____	_____	<u>(select 14-15 credits)</u>			
ENGL 202C or ENGL 202D	(3)	_____	_____	_____			
ENT 313	(2)	_____	_____	_____			
ENT 316	(1)	_____	_____	_____			
HORT 407	(3)	_____	_____	_____			
MATH 022 (or higher)	(3)	_____	_____				
PPEM 405	(3)	_____	_____				
SOILS 101*	(3)	_____	_____				
SOILS 102	(1)	_____	_____				
SOILS 401	(3)	_____	_____				
SOILS 402	(3)	_____	_____	<u>Electives</u>			
SOILS 403 or SOILS 412W	(2-3)	_____	_____	_____			
STAT 200/240/250	(3-4)	_____	_____	_____			

\*C-required

Last Updated 4/2014

**GENERAL EDUCATION**

Course	Cr.	Grade	Sem.
<b>Skills (15 credits)</b>			
<u>Communications</u> (GWS 9 credits)			
[satisfied by 9 credits from ENGL 015 or 30, ENGL 202C/D and CAS 100 in prescribed courses]			
<u>Quantification</u> (GQ 6 credits)			
[satisfied by 6 credits from MATH 022 (or higher) and STAT 200/240/250]			
<b>Knowledge Domain (30 credits)</b>			
<u>Natural Sciences</u> (GN 9 credits)			
[satisfied by 9 credits from BIOL 110, CHEM 110, CHEM 111, and SOILS 101 in Prescribed Courses]			
<u>Arts</u> (GA 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Humanities</u> (GH 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Social &amp; Behavioral Sciences</u> (GS 6 cr)			
[3 credits satisfied from ECON 102/ECON 104/AG BM 101			
_____	(3)	_____	_____
<u>Health &amp; Physical Activity</u> (GHA 3 cr)			
_____		_____	_____
_____		_____	_____
<b>US Cultures and International Cultures Requirement</b>			
(3 credits US and 3 credits IL)			
[can be satisfied by GA/US, GA/IL, GH/US or GH/IL]			
_____	(IL)	_____	_____
_____	(US)	_____	_____

Student: \_\_\_\_\_  
 PSU ID: \_\_\_\_\_  
 Advisor: \_\_\_\_\_

The Pennsylvania State University  
**PLANT SCIENCES MAJOR**  
*Horticulture Option*  
 120 Credits Required

Minor: \_\_\_\_\_  
 Program Year: \_\_\_\_\_  
 Expected Graduation Date: \_\_\_\_\_

**REQUIREMENTS FOR THE MAJOR**

Course	Cr.	Grade	Sem.	Course	Cr.	Grade	Sem.
<b>Prescribed Courses (76-80 credits)</b>				<b>Supporting Courses (26-38 credits)</b>			
Freshman Seminar (AG 150S)	(1-3)	_____	_____	<u>Business/Spanish Selection (select 3)</u>			
AGECO 457*	(3)	_____	_____	AG BM 407, B LAW 243,	_____	_____	_____
AGECO 461*	(3)	_____	_____	B A 301, B A 303, SPAN 001,	_____	_____	_____
AGRO 438/HORT 238	(3)	_____	_____	SPAN 002, SPAN 003, SPAN 105	_____	_____	_____
BIOL 110	(4)	_____	_____				
CAS 100	(3)	_____	_____	<u>Plant Materials or Production Selection (select 1)</u>			
CHEM 110	(3)	_____	_____	HORT 131, HORT 137, HORT 138,			
CHEM 111	(1)	_____	_____	HORT 431, HORT 432, HORT 433	(3)	_____	_____
ECON 102/104/AG BM 101	(3)	_____	_____				
ENGL 015 or 30	(3)	_____	_____	<u>Horticulture Production Selection (select 6-7 credits)</u>			
ENGL 202C or ENGL 202D	(3)	_____	_____	HORT 408, HORT 431, HORT 432,	_____	_____	_____
ENT 313	(2)	_____	_____	HORT 433, HORT 450, HORT 453	_____	_____	_____
ENT 314	(1)	_____	_____				
HORT 101*	(3)	_____	_____	<u>Supporting Courses</u>			
HORT 202*	(3)	_____	_____	(select 8-16 credits)			
HORT 232	(3)	_____	_____				
HORT 315*	(3)	_____	_____				
HORT 402W	(3)	_____	_____				
HORT 407	(3)	_____	_____				
HORT 412W*	(3)	_____	_____				
HORT 420	(3)	_____	_____				
HORT 445	(3)	_____	_____	<b>Electives</b>			
HORT 455	(3)	_____	_____				
HORT 495/496	(1)	_____	_____				
MATH 022 (or higher)	(3-4)	_____	_____				
PPEM 300 or 405	(3)	_____	_____				
SOILS 101*	(3)	_____	_____				
STAT 200/240/250	(3-4)	_____	_____				

\*C-required

Last Updated 7/2014

**GENERAL EDUCATION**

Course	Cr.	Grade	Sem.
<b>Skills (15 credits)</b>			
<u>Communications</u> (GWS 9 credits) [satisfied by 9 credits from ENGL 015 or 30, ENGL 202C/D and CAS 100 in prescribed courses]			
<u>Quantification</u> (GQ 6 credits) [satisfied by 6 credits from MATH 022 (or higher) and STAT 200/240/250]			
<b>Knowledge Domain (30 credits)</b>			
<u>Natural Sciences</u> (GN 9 credits) [satisfied by 9 credits from BIOL 110, CHEM 110, CHEM 111, and HORT 101 in Prescribed Courses]			
<u>Arts</u> (GA 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Humanities</u> (GH 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Social &amp; Behavioral Sciences</u> (GS 6 cr) [3 credits satisfied from ECON 102/AG BM 101]			
_____	(3)	_____	_____
<u>Health &amp; Physical Activity</u> (GHA 3 cr)			
_____		_____	_____
_____		_____	_____
<b>US Cultures and International Cultures Requirement</b> (3 credits US and 3 credits IL) [can be satisfied by GA/US, GA/IL, GH/US or GH/IL]			
_____	(IL)	_____	_____
_____	(US)	_____	_____

Student: \_\_\_\_\_  
 PSU ID: \_\_\_\_\_  
 Advisor: \_\_\_\_\_

The Pennsylvania State University  
**PLANT SCIENCES MAJOR**  
*Plant Science Option*  
 120 Credits Required

Minor: \_\_\_\_\_  
 Program Year: \_\_\_\_\_  
 Expected Graduation Date: \_\_\_\_\_

**REQUIREMENTS FOR THE MAJOR**

Course	Cr.	Grade	Sem.	Course	Cr.	Grade	Sem.
<b>Prescribed Courses (65-68 credits)</b>				<b>Supporting Courses (25-31credits)</b>			
Freshman Seminar (AG 150S)	(1-3)	_____	_____	<u>Plant Production Selection</u>			
AGECO 457*	(3)	_____	_____	AGRO 028 or HORT 101	_____	_____	_____
AGECO 461*	(3)	_____	_____				
AGECO/AGRO/HORT 495/496	(1)	_____	_____	<u>Microbiology, Molecular Biology &amp; Biochemistry Selection</u> (select 4-6 credits)			
BIOL 110	(4)	_____	_____	BIOL 230W, BIOL 240W, BMB 211, BMB 212,			
BIOL 127*	(3)	_____	_____	MICRB 201, MICRB 202, MICRB 251	_____	_____	_____
BIOL 222	(3)	_____	_____	MICRB 252	_____	_____	_____
CAS 100	(3)	_____	_____				
CHEM 110	(3)	_____	_____	<u>Writing Selection</u> (select 3-4 credits)			
CHEM 111	(1)	_____	_____	AGRO 410W, HORT 412W,	_____	_____	_____
CHEM 112	(3)	_____	_____	SOILS 412W			
CHEM 113/113B	(1)	_____	_____				
CHEM 210	(3)	_____	_____	<u>Plant Ecology, Evolution, Systematics</u> (select 3-4 credits)			
CHEM 212	(3)	_____	_____	BIOL 412, BIOL 414, BIOL 427,			
CHEM 213/213B	(2)	_____	_____	BIOL 428, BIOL 436, BIOL 448,			
ECON 102/104/AG BM 101	(3)	_____	_____	ENT/VBSC 402W, ENT 420,			
ENGL 015 or 30	(3)	_____	_____	HORT 445, PPEM 425			
ENGL 202C or ENGL 202D	(3)	_____	_____				
ENT 313	(2)	_____	_____	<u>Plant Genetics/Biotechnology</u> (select 3 credits)			
ENT 314	(1)	_____	_____	AGRO460, BIOL 439, HORT 407,			
MATH 022 (or higher)	(3)	_____	_____	HORT/BIOTC 459			
PHYS 250	(3)	_____	_____				
PPEM 405*	(3)	_____	_____	<u>Plant Microbiology/Entomology</u> (select 3-4 credits) ENT 402W, ENT 410, PPEM 416, or PPEM 425			
SOILS 101*	(3)	_____	_____				
STAT 200/240/250	(3-4)	_____	_____				
<b>*C-required</b>							
<b>Electives (select 4-12 credits)</b>							
_____				<u>General Plant Science Selection</u> (select 6-7 credits)			
_____				AGRO 410W, AGRO 460, BIOL 407, BIOL 424, BIOL 441, HORT 402W, HORT 407, HORT 412W, HORT 420, PPEM 417, PPEM/ERM 430			
_____							

Last Updated 7/2014

**GENERAL EDUCATION**

Course	Cr.	Grade	Sem.
<b>Skills (15 credits)</b>			
<u>Communications</u> (GWS 9 credits) [satisfied by 9 credits from ENGL 015 or 30, ENGL 202C/D and CAS 100 in prescribed courses]			
<u>Quantification</u> (GQ 6 credits) [satisfied by 6 credits from MATH 022 (or higher) and STAT 200/240/250]			
<b>Knowledge Domain (30 credits)</b>			
<u>Natural Sciences</u> (GN 9 credits) [satisfied by 9 credits from BIOL 110, CHEM 110, CHEM 111, and HORT 101 in Prescribed Courses]			
<u>Arts</u> (GA 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Humanities</u> (GH 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Social &amp; Behavioral Sciences</u> (GS 6 cr) [3 credits satisfied from ECON 102/AG BM 101]			
_____	(3)	_____	_____
<u>Health &amp; Physical Activity</u> (GHA 3 cr)			
_____		_____	_____
_____		_____	_____
<b>US Cultures and International Cultures Requirement</b>			
(3 credits US and 3 credits IL) [can be satisfied by GA/US, GA/IL, GH/US or GH/IL]			
_____	(IL)	_____	_____
_____	(US)	_____	_____

Student: \_\_\_\_\_  
 PSU ID: \_\_\_\_\_  
 Advisor: \_\_\_\_\_

The Pennsylvania State University  
**PLANT SCIENCES MAJOR**  
*Plant Genetics and Biotechnology Option*  
 120 Credits Required

Minor: \_\_\_\_\_  
 Program Year: \_\_\_\_\_  
 Expected Graduation Date: \_\_\_\_\_

**REQUIREMENTS FOR THE MAJOR**

Course	Cr.	Grade	Sem.	Course	Cr.	Grade	Sem.
<b>Prescribed Courses (73-78 credits)</b>				<b>Supporting Courses (21-27 credits)</b>			
Freshman Seminar (AG 150S)	(1-3)	_____	_____	<u>Microbiology, Molecular Biology &amp; Biochemistry Selection</u> (select 4-6 credits)	_____	_____	_____
AGECO 457*	(3)	_____	_____	BIOL 230W, BIOL 240W, BMB 211, BMB 212, MICRB 201, MICRB 202, MICRB 251, MICRB 252	_____	_____	_____
AGECO/PLANT 461*	(3)	_____	_____	<u>Plant Ecology, Evolution, Systematics</u> (select 3-4 credits)	_____	_____	_____
AGECO/AGRO/HORT 495/496	(1)	_____	_____	BIOL 412, BIOL 414, BIOL 427, BIOL 428, BIOL 436, BIOL 448, ENT/VBSC 402W, ENT 420,	_____	_____	_____
AGRO/BIOTC 460	(3)	_____	_____	_____	_____	_____	_____
BIOL 110	(4)	_____	_____	<u>Plant Genetics/Biotechnology</u> (select 2-3 credits)	_____	_____	_____
BIOL 127*	(3)	_____	_____	BIOL 439, IBIOS 571, BIOTC 479, HORT 497B, IBIOS 593	_____	_____	_____
BIOL 222	(3)	_____	_____	<u>Plant Microbiology/Entomology</u> (select 3-4 credits) ENT 402W, ENT 410, PPEM 416, or PPEM 425	_____	_____	_____
BMB 400	(2)	_____	_____	<u>Production Selection</u> (select 3 credits)	_____	_____	_____
CAS 100	(3)	_____	_____	AGRO 423, AGRO 425, HORT 202, HORT 315, HORT 431, HORT 432, HORT 433, HORT 450, SOILS/AGECO/AN SC 418	_____	_____	_____
CHEM 110	(3)	_____	_____				
CHEM 111	(1)	_____	_____				
CHEM 112	(3)	_____	_____				
CHEM 210	(3)	_____	_____				
ECON 102/104/AG BM 101	(3)	_____	_____				
ENGL 015 or 30	(3)	_____	_____				
ENGL 202C or ENGL 202D	(3)	_____	_____				
ENT 313	(2)	_____	_____				
ENT 316	(1)	_____	_____				
HORT 101 or AGRO 028	(3)	_____	_____				
HORT 407	(3)	_____	_____				
HORT 459	(3)	_____	_____				
MATH 022 (or higher)	(3-5)	_____	_____				
PHYS 250	(4)	_____	_____				
PPEM 405*	(3)	_____	_____				
SOILS 101	(3)	_____	_____				
STAT 200/240/250	(3-4)	_____	_____				
<b>*C-required</b>							
<b>Electives (select 3 credits)</b>							
_____	_____	_____	_____	<u>General Plant Science Selection</u> (select 6-7 credits)			
_____	_____	_____	_____	AGRO 410W, AGRO 460, BIOL 407, BIOL 424, BIOL 441, HORT 402W, HORT 407, HORT 412W, HORT 420, PPEM 417, PPEM/ERM 430			
_____	_____	_____	_____				

Last Updated 5/2015

**GENERAL EDUCATION**

Course	Cr.	Grade	Sem.
<b>Skills (15 credits)</b>			
<u>Communications</u> (GWS 9 credits) [satisfied by 9 credits from ENGL 015 or 30, ENGL 202C/D and CAS 100 in prescribed courses]			
<u>Quantification</u> (GQ 6 credits) [satisfied by 6 credits from MATH 022 (or higher) or higher, and STAT 200/240/250]			
<b>Knowledge Domains (30 credits)</b>			
<u>Natural Sciences</u> (GN 9 credits) [satisfied by 9 credits from BIOL 110, CHEM 110, CHEM 111, HORT 101/AGRO 028]			
<u>Arts</u> (GA 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Humanities</u> (GH 6 credits)			
_____	(3)	_____	_____
_____	(3)	_____	_____
<u>Social &amp; Behavioral Sciences</u> (GS 6 cr)			
[3 credits satisfied from ECON 102/AG BM 101]			
_____	(3)	_____	_____
<u>Health &amp; Physical Activity</u> (GHA 3 cr)			
_____	_____	_____	_____
_____	_____	_____	_____
<b>US Cultures and International Cultures Requirement</b> (3 credits US and 3 credits IL) [can be satisfied by GA/US, GA/IL, GH/US or GH/IL]			
_____	(IL)	_____	_____
_____	(US)	_____	_____



