Course Title: *Botany and Plant Systems**
Board Approval Date: November 17, 2020
Credit / Hours: 1 Credit / 126 Hours

Course Description:

This course will provide students with an overview of the structure, growth, and development of plant life. The course will begin with a study of the structure and function of each aspect of plants and will also cover the various environmental factors that impact plant growth as well as the management considerations used in agronomy. Students will complete an in-depth project on a fruit or vegetable of their choice. Students will focus on the systems and adaptations within plants as well as the management practices that are necessary for successful plant production. Students will be introduced to Integrated Pest Management, soil testing, and biotechnology. This course contributes to the Ag. General (CIP 01.000) and Applied Horticultural (CIP 01.0601) pathways.
**Botany and Plant Systems is combined with a College in the High School course: Introduction to Ornamental Horticulture (1 Penn College Credit)*

Learning Activities / Modes of Assessment:

Small Group
Whole Group
Independent
One-on-One
Classwork Activities
Greenhouse Work
Projects
Presentations
Research
Test
Quizzes
Writing

Instructional Resources:

Textbooks
Lab Materials/Kits
Online Resources
Research Journals
Greenhouse
Guest Speakers
Penn College Curriculum

Curriculum: Horticulture
Course: Botany & Plant Systems

Know/Task:	Understand:	Do:
General Ag 201-Classify plants using dichotomous keys General Ag 204-Identify products and uses of plant species in the industry 309-Classify plants and use appropriate binomial taxonomic terminology	Students will know: the levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world	Students will be able to: Identify the levels of taxonomy, Linnaeus' classification system, and the historical and modern uses of plants across the world
General Ag 202-Identify the components & structures of plants 302-Identify plant cell structure, organization, & function	Students will know: the difference between the components and structures of a plant cell and an animal cell, and the structures of plant cells and their function	Students will be able to: identify plant components and structures, articulate the functions of plant structures, discuss the differences between a plant cell and an animal cell
General Ag 203-Explain the functions of plant systems General Ag 207-Assess the environmental factors that affect the development and maintenance of a plant.	Students will know: how plant structures directly correlates to its function, what conditions are required for seed germination, identify germination issues, and	Students will be able to: germinate any seed any time of the year, manipulate growing conditions, explain the anatomy and physiology of plant structures

303--Identify plant structures & explain their functions 304-Identify conditions essential for seed germination 305-Explain the environmental factors that affect the growth & development of a plant 509-Identify environmental factors that affect plant growth	discuss how to change environmental factors to suit plant needs	
General Ag 205-Explain the process of photosynthesis/respiration and their importance to life 301-Describe the process of photosynthesis, respiration, translocation, and transpiration.	Students will know: how the processes of photosynthesis, cellular respiration, translocation, & transpiration work in plants, and how these processes sustain all life	Students will be able to: describe how photosynthesis, cellular respiration, translocation, & transpiration work in plants, and how these processes sustain all life
General Ag 206-Identify and analyze the functions of the essential nutrients for plant development General Ag 301-Explain the processes of soil formation	Students will know: how to analyze soil and remediate if necessary, identify the 16 plant nutrients, describe nutrient function in plants, identify nutrient deficiencies,	Students will be able to: perform soil tests, calculate appropriate fertilizer amounts, remediate soil using sustainable methods, identify nutrient

General Ag 302-Identify & describe physical, chemical, & biological soil characteristics General Ag 303-Perform proper soil sampling techniques General Ag 304-Analyze & interpret the results of a soil test General Ag 305-Identify fertilizer rates to maintain proper plant nutrition General Ag 306-Draw conclusions from a soil survey to determine land uses, capability factors, & land capability classes General Ag 307-Compare & contrast soil conservation practices & soil management techniques General Ag 308-Investigate emerging technologies within soil science 307-Identify plant nutrient requirements	explain how soil forms, and what components make up soil	deficiencies, and perform soil analysis utilizing NRCS

308-Describe the nutrient cycles 501-Identify & describe soil characteristics 502-Identify soil and/or plant nutrients 503-Describe soil management techniques		
General Ag 210-Examine the impact of pests & diseases in plant production 207-Identify various horticultural pests including their signs and symptoms	Students will know: the common plant pests in PA, identify pathogens that impact plant populations, how pathogens impact plant growth and function, and how to eradicate pests	Students will be able to: identify common plant pathogens and discuss their impact on productivity
General Ag 209-Analyze the effectiveness of IPM strategies General Ag 211-Connect the role of plant pollinators to food production 206-Distinguish the components of an IPM program including the effects of chemicals & pesticides on the environment	Students will know: what IPM is and its overall goal, how to protect important insect species while eradicating pests, and what the negative implications of chemicals are on water and soil	Students will be able to: identify the methods of IPM, develop an IPM plan, distinguish between good and bad insects, calculate economic injury level and economic threshold, and employ IPM methods

General Ag 208-Compare & contrast sexual & asexual plant reproduction 308-Distinguish between sexual and asexual plant reproduction	Students will know: how plants reproduce and differentiate between asexual and sexual reproduction	Students will be able to: explain the process of sexual and asexual reproduction and create circumstances that allow for maximum reproductive success
General Ag 212-Investigate emerging technologies within plant science General Ag 801-Define biotechnology & research the historical impact it has had on agriculture General Ag 802-Investigate current applications of biotechnology in agriculture General Ag 803-Explore ethical, legal, & social biotechnology issues 511-Describe techniques used to control environmental factors Describe how weather & climate impact growing conditions & plant selection	Students will know: what biotechnology is and the recent advancements, how biotechnology has impacted both producers and consumers, how to ethically and morally create GMO's while maintaining human health, and how we manipulate environmental conditions to increase plant yields	Students will be able to: define and describe biotechnology and its recent developments, discuss the research and trial phase of GMO's, and manipulate environmental conditions to enhance quality and quantity

701-Explain the uses of technologically altered plants		

Pacing Guide

Course: Botany & Plant Systems

Course Unit (Topic)	**Length of Instruction (Class Periods)**
Plant Naming, Classification, & Use	7 Periods
Plant Anatomy	10 Periods
Growth & Development	10 Periods
Photosynthesis & Cellular Respiration	15 Periods
Soil & Nutrients	15 Periods
Plant Pathogens	7 Periods
IPM	7 Periods
Plant Reproduction	7 Periods
Biotechnology & GMO's	8 Periods
Final Review & Assessment	4 Periods
Total:	**90 Periods**