PLSC - PLANT SCIENCES

PLSC110 Introduction to Horticulture (3 Credits)
An overview to the art and science of horticulture. Relationships between plant science and plant production, the use of horticultural plants and plant stress as influenced by cultural practices.
Credit Only Granted for: PLSC100 or PLSC110 and PLSC111.
Formerly: PLSC100.

PLSC111 Introduction to Horticulture Laboratory (1 Credit)
The goal of this course is to expand your knowledge of the growth and development of horticultural crops. An integrated understanding of horticulture will come from laboratory experiments and field trips. This course is designed to complement lecture material from PLSC 110.
Corequisite: PLSC110 or permission of the Department of Plant Science and Landscape Architecture.

PLSC112 Introductory Crop Science (3 Credits)
Major crop plants including: anatomy, physiology, morphology, history, use, adaptation, culture, improvement and economic importance.
Credit Only Granted for: PLSC101 or PLSC112 and PLSC113.
Formerly: PLSC101.

PLSC113 Introductory Crop Science Laboratory (1 Credit)
An introduction to the growth, function and identification of agronomic crops and the environment in which they are produced. This course is designed to complement the lecture material from PLSC 112.
Corequisite: PLSC112 or permission of the Department of Plant Science and Landscape Architecture.
Credit Only Granted for: PLSC101 or PLSC112 and PLSC113.

PLSC115 How Safe is Your Salad? The Microbiological Safety of Fresh produce (3 Credits)
As food is produced in larger quantities and made to travel longer distances, keeping our food safe in this day and age is an ever growing challenge. This course will focus on the question of what it takes to grow and maintain safe fruits and vegetables, as food travels along the path from the farm to your fork. Food safety of fresh produce will be discussed from the public health, agricultural, economical and policy perspectives.
Recommended: PLSC110 and PLSC111; or (PLSC112 and PLSC113); or BSCI105; or (BSCI170 and BSCI171).

PLSC125 Feeding Ten Billion by 2050: Food Security and Crop Protection (3 Credits)
A big question concerning global food security is "how can we feed 10 billion people in 2050?" This course will stimulate creative thinking about possible solutions particularly from the crop production perspective. The instructors will introduce the concept of food security and different dimensions of this complex issue, identify major constraints to food security, and discuss scientific approaches that may be used to meet the grand challenge. Emphasis will be placed on topical and controversial issues such as the impact of climate change, biofuel production and GM crops on food security, and novel strategies that can improve food security.

PLSC130 Did Yeast Create Civilization? (3 Credits)
Did yeast create civilization? Fermented foods have played a major role in the transition from nomadic to settled agrarian societies, the establishment of social and religious customs, the expansion of empires, and modern economies. To what extent are our past and current attitudes towards fermented foods rooted in historical and cultural imprints? Explore the central role of fermentation in human history and culture, the basic microbiological processes underlying fermentation processes, and the processes used to produce and distribute fermented foods. Find out how the fruits, grains, and dairy products used to produce fermented foods are grown and selected. Students will learn about the development and modern use of fermented dairy products, pickles, bread, tea, chocolate, wine, beer, distilled liquors, and pharmaceutical/manufactured products.
Recommended: CHEM103, CHEM131, CHEM135, or CHEM146.
Cross-listed with: AGST130.
Credit Only Granted for: AGST130 or PLSC130.

PLSC171 Introduction to Urban Forestry (3 Credits)
Students are taught the basic concepts and principles of urban forestry. They will learn about the role of urban forests and green infrastructure as related to sustainability of local and global environments and communities. Urban forests will be studied from the perspectives of science, community development, landscape management, public policies, and laws.

PLSC201 Plant Structure and Function (3 Credits)
The relationship between plant structure and function and how the environment influences changes in the physiology to control higher plant growth and development are studied. Survey of the organizational structure of plants from the molecular to the morphological level and gain an understanding of how the plant functions to grow and reproduce.
Prerequisite: Minimum grade of C- in PLSC110 and PLSC111 or (PLSC112 and PLSC113); and minimum grade of C- in CHEM131 and CHEM132.

PLSC203 Plants, Genes and Biotechnology (3 Credits)
An overview of the history, genetics, and reproductive mechanisms for agronomic and horticultural plants that examines mechanisms of genetic improvement ranging from traditional plant breeding to tissue culture and genetic engineering. Social and political issues such as germplasm preservation and international intellectual property rights will also be discussed.
Prerequisite: Minimum grade of C- in BSCI103; or minimum grade of C- in BSCI170 and BSCI171.

PLSC205 Introduction to Turf Science and Management (4 Credits)
Principals of turf science and culture with emphasis on turfgrass anatomy, morphology, and physiology. The role of cultural interventions in achieving specific aesthetic and functional objectives is examined for multiple turf uses. Pest problems typically encountered in turfgrass management are also covered.
Credit Only Granted for: PLSC205 or PLSC305.
Formerly: PLSC305.

PLSC206 Plant Structure and Function Laboratory (1 Credit)
Provide hands-on experience for students who are concurrently taking PLSC201 or other interested students and train students how to collect quantitative data from plants and perform statistical analysis (i.e., Student's t-test and chi-square analysis) of the data using Excel. The students will also have opportunity to access and analyze biological datasets from publicly available sources to build phylogenetic trees and explore gene expression patterns.
Prerequisite: PLSC201 or permission of instructor .

PLSC226 Plant Diversity (4 Credits)
Students will learn to identify and understand relationships among major plant families of northeastern North America, especially of the Mid-Atlantic region, through lecture, field, and laboratory study. Characteristics and biogeography of and evolutionary relationships among families are emphasized in lecture. These characteristics will be woven together to provide understanding of the ecological and evolutionary drivers of plant diversity and the history of the field. Sight identification of families, genera, and species and keying skills are stressed in field and laboratory sessions.
Prerequisite: Minimum grade of C- in PLSC201 and PLSC206; or permission of instructor.

PLSC244 Herbaceous Plants (3 Credits)
Herbaceous plants are integral components of residential and commercial landscapes. Students will become familiar with 250 annual and perennial plants. The emphasis will be on plant management requirements and seasonal variation in the landscape.
Prerequisite: PLSC110 and PLSC111; or (PLSC112 and PLSC113).
Credit Only Granted for: PLSC244 or PLSC489A.
Formerly: PLSC489A.

PLSC250 Lawns in the Landscape: Environmental Hero or Villain? (3 Credits)
Examination of the lawn as an element in the anthropogenic landscape and its influence on global warming, regional air and water quality, ecological diversity, mammalian pesticide exposure and consumptive water use. Demographic and socioeconomic factors are examined in the context of being predictors of landscape aesthetic desires and lawn management behaviors. Policies that incentivize lawn alternatives or changes in lawn management behavior are discussed.Cross-listed with ENSP250.
Credit Only Granted for: ENSP250 or PLSC250.

PLSC251 Financial Applications for the Green Industry (3 Credits)
An introduction to the application of financial principles in the Green Industry business sector. Accounting, pricing, and estimating, job cost management and production efficiency are discussed and manifested in Scholarship In Practice exercises, case studies and a business plan project.
Credit Only Granted for: PLSC361 or PLSC251.
Formerly: PLSC361.

PLSC253 Woody Plants for Mid-Atlantic Landscapes I (3 Credits)
A field and laboratory study of trees, shrubs, and vines used in ornamental plantings. Major emphasis is placed on native deciduous plant materials.
Recommended: Minimum grade of C- in PLSC110 and PLSC111.

PLSC254 Woody Plants for Mid-Atlantic Landscape II (3 Credits)
A field and laboratory study of trees, shrubs, and vines used in ornamental plantings. Major emphasis is placed on introduced and evergreen plant materials.
Recommended: Minimum grade of C- in PLSC110, PLSC111, and PLSC253.

PLSC271 Plant Propagation (3 Credits)
A study of the principles and practices in the propagation of plants.
Prerequisite: Minimum grade of C- in PLSC110 and PLSC111 or (PLSC112 and PLSC113); or minimum grade of C- in BSCI170 and (BSCI180 or BSCI171).

PLSC272 Principles of Arboriculture (3 Credits)
The establishment and maintenance of healthy trees in an urban setting will be studied. Lectures will focus on the environmental constraints to tree development in the city, and the role of physiological processes in regulating tree vigor. Laboratory exercises will cover the unique aspects of urban soils, tree valuation procedures, pruning and training, and supervised climbing.
Cross-listed with: INAG272.
Credit Only Granted for: INAG272 or PLSC272.

PLSC303 Global Food Systems (3 Credits)
An introduction to the global food system and its agricultural, biophysical, and socioeconomic domains. The problems and potentials for increasing world food supply based on current agronomic knowledge. Emphasis on international aspects of food crop production as its interrelationships with people and the environment in the developing world.
Recommended: BSCI170 and (BSCI180 or BSCI171); or comparable content in ecosystems ecology, agroecology, global change biology.

PLSC388 Honors Thesis Research (3-6 Credits)
Undergraduate honors thesis research conducted under the direction of an AGNR faculty member in partial fulfillment of the requirements of the College of AGNR Honors Program. The thesis will be defended to a faculty committee.
Prerequisite: Must be in the AGNR Honors Program.
Repeatable to: 6 credits if content differs.

PLSC389 Internship (1-3 Credits)
Credit will be given for practical work carried out at one or more horticultural, agronomic, landscape industries, botanical gardens, or arboreta under formally arranged internships.
Prerequisite: Permission of AGNR-Plant Science & Landscape Architecture department.
Restriction: Junior standing or higher. And must be in Plant Sciences program; or must be in Landscape Architecture program.
Repeatable to: 6 credits if content differs.

PLSC398 Seminar (1 Credit)
Oral presentation of the results of investigational work by reviewing recent scientific literature in the various phases of natural resource sciences, horticulture and agronomy.
Restriction: Senior standing. And must be in Landscape Architecture program; or must be in Plant Sciences program.

PLSC399 Special Problems in Plant Science (1-3 Credits)
Research projects in Plant Science including field, greenhouse, laboratory, studio and/or library studies. Research is conducted under the direction of a faculty member.
Prerequisite: Permission of the instructor .
Repeatable to: 6 credits.

PLSC400 Plant Physiology (4 Credits)
An in-depth examination of the unique molecular and physiological principles necessary to understand how plants grow and respond to the environment at the cellular and organismal levels. Plants evolved unique metabolism and survival strategies, so students should be prepared to enter a world that may be new to them.
Prerequisite: Minimum grade of C- in BSCI170 and (BSCI180 or BSCI171); or minimum grade of C- in PLSC201 and PLSC206; and minimum grade of C- in CHEM231 and CHEM232; or minimum grade of C- in CHEM237.
Cross-listed with: BSCI442.
Credit Only Granted for: BSCI442 or PLSC400.

PLSC401 Pest Management Strategies for Turfgrass (3 Credits)
Interdisciplinary view of weed, disease, and insect management from an agronomy perspective. Plant responses to pest invasion, diagnosis of pest-related disorders, and principles of weed, disease and insect suppression through cultural, biological and chemical means are discussed.
Prerequisite: PLSC205.

PLSC402 Sports Turf Management (3 Credits)
Sports turf management, including design, construction, soil modification, soil cultural techniques, pesticide use, fertilization, and specialized equipment.
Prerequisite: PLSC305 and PLSC401.

PLSC404 Plant and Fungal Metabolism (3 Credits)
An introduction to biochemistry and metabolism in plants and fungi, covering the biosynthesis of compartments in plant and fungal cells with biological molecules such as nucleic acids, amino acids and lipids. Energy flow processes such as photosynthesis, carbohydrate metabolism and respiration, are covered in the course. The integration of different pathways in plant development and responses to environmental stresses will be discussed.
Prerequisite: Minimum grade of C- in BSCI170 and (BSCI180 or BSCI171); or minimum grade of C- in PLSC201 and PLSC206.

PLSC405 Agroecology (3 Credits)
How can we balance the multiple, and often competing objectives of sustainable agricultural intensification to promote both agricultural productivity and human wellbeing? The answer to this question requires a transdisciplinary, agroecological perspective. Agroecology is the integrative study of the ecology of the entire food system, encompassing ecological, economic and social dimensions. This course is designed to introduce various topics in agroecology (e.g. organic agriculture, biodiversity, the Farm Bill). We will take an ecosystems approach to the study of agriculture that will enable students to analyze the environmental, social, and economic interconnections within various types of agricultural systems locally and globally.
Prerequisite: At least one course in ecology with a minimum grade of C-; or permission of instructor.
Recommended: BSCI361 or PLSC471; or any BSCI or ENST ecology course.
Credit Only Granted for: PLSC405 or PLSC605.
Additional Information: Class will be held on campus, with two day-long field trips to local farms.

PLSC407 Advanced Crop Science (3 Credits)
Focuses on the study of the agronomic principles and practices required for the production of food, feed, fiber and fuel crops. This is a project-based course where students will develop a farm plan from knowledge gained in previous courses and built upon in this course. Students will learn to integrate data and information from many sources in order to build and operate a successful and sustainable agronomic farm operation using current and new technology. The use of farm management software will be an integral part of the course and farm project.
Prerequisite: (PLSC110 and PLSC111) OR (PLSC112 and PLSC113), BSCI160 and (BSCI180 or BSCI161), and MATH113 or higher.
Recommended: ANSC101.
Credit Only Granted for: PLSC407 or AGST400.
Formerly: PLSC407.
Additional Information: There will be two required Saturday field trips during the semester. Because of the changing nature of agriculture, the dates of these field trips will be decided upon at the beginning of the semester by discussion among the students and based on cooperators availability and environmental factors. Students will have a minimum of two weeks notice as to the dates of the field trips.

PLSC410 Commercial Turf Maintenance and Production (3 Credits)
Agronomic programs and practices used in hydroseeding, commercial lawn care, sod production and seed production. Current environmental, regulatory and business management issues confronting the turfgrass industry.
Prerequisite: PLSC305; or permission of AGNR-Plant Science & Landscape Architecture department.

PLSC411 Plant Genetics (3 Credits)
An introduction to genetic principles and technologies in plants, centered on linking phenotype to genotype. Topics include Mendelian inheritance of single and complex traits, epigenetics, population genetics and plant breeding. Examples on creating and mapping genetic mutations in both model plants and non-model crops are discussed. Current genetic and genomic approaches are highlighted, such as genome engineering and reprogramming, TILLING, and genome-wide association mapping.
Prerequisite: Minimum grade of C- in BSCI170 and (BSCI180 or BSCI171).

PLSC420 Principles of Plant Pathology (4 Credits)
An introduction to the causal agents, nature and management of plant diseases with particular attention paid to economically important diseases of horticultural and agronomic crops.
Prerequisite: Minimum grade of C- in CHEM131, CHEM132, PLSC201, and PLSC206; or students who have taken courses with comparable content may contact the department.

PLSC425 Green Roofs and Urban Sustainability (1 Credit)
The integration of disciplines associated with sustainability issues. Topics range from plant science to design to policy, all of which can contribute to improving the urban environment.
Credit Only Granted for: PLSC425 or PLSC489V.
Formerly: PLSC489V.

PLSC427 Plant Microbe Associations (3 Credits)
Encompasses advanced investigation and analyses of the ecology, physiology and molecular genetics of plant-microbe interactions along with their impact on crop production, ecological and food production systems.
Credit Only Granted for: PLSC489W or PLSC427.
Formerly: PLSC489W.

PLSC430 Water and Nutrient Planning for the Nursery and Greenhouse Industry (3 Credits)
Skills will be developed in order to write nutrient management plans for the greenhouse and nursery industry. Completion of this course can lead to professional certification in nutrient planning by the State of Maryland after MDA examinations are passed.
Prerequisite: Minimum grade of C- in CHEM131 and CHEM132; or minimum grade of C- in ENST200; or permission of instructor.
Recommended: PLSC432.

PLSC432 Greenhouse Crop Production (3 Credits)
The commercial production and marketing of ornamental plant crops under greenhouse, plastic houses and out-of-door conditions. Integrating an understanding of basic plant physiological mechanisms into the decision-making process for the design, construction, maintenance and day-to-day management of greenhouse operations.
Prerequisite: Minimum grade of C- in PLSC201 and PLSC206.

PLSC433 Technology of Fruit and Vegetable Production (4 Credits)
A critical analysis of research work and application of the principles of plant physiology, chemistry and botany to practical problems in the commercial production of fruit and vegetable crops.
Prerequisite: Minimum grade of C- in PLSC201, PLSC206, PLSC271, and ENST200; or permission of instructor.
Restriction: Junior standing or higher.

PLSC434 The Quest for Color (3 Credits)
Finding sources of color in nature has motivated mindful inquiry and technical innovation across cultures. Yet, the quest for new colors has been both a result of and an excuse for colonization, appropriation of indigenous knowledge, and enslavement. When natural dyestuffs were largely replaced by synthetic dyes derived from coal tar in the late 1800s, color development posed new ecological and cultural challenges. In spite of these threats, practitioners worldwide have maintained their traditional methods without exploitation or petroleum products. This course integrates the history and chemistry of dye materials from plants and insects with hands-on practice in sustainable color creation. Students will hone the practical skills needed to source and process foraged dye materials, and apply them sustainably to fibers. Via this scientific process students will gain insight into the benefits of a naturally sourced approach to color and to life.
Credit Only Granted for: PLSC434 or HONR218R.
Formerly: HONR218R.

PLSC452 Environmental Horticulture (3 Credits)
Environmental horticulture principles used in the establishment and maintenance of plant materials in residential and commercial landscapes will be addressed. The effect of soil conditions, environmental factors, and commercial practices will be discussed in relation to the growth and development of newly-installed plant materials. Field diagnostics will be used by students to assess significant problems of plant decline. Environmental sustainability will be combined with current commercial practices of storm water management, nutrient management, and irrigation management to achieve an integrated approach to plant management.
Prerequisite: Minimum grade of C- in PLSC110 and PLSC111; or minimum grade of C- in PLSC112 and PLSC113.
Recommended: Minimum grade of C- in PLSC253 and PLSC254.

PLSC453 Weed Science (3 Credits)
Weed identification, ecology, and control (cultural, mechanical, biological, and chemical methods).

PLSC460 Application of Knowledge in Plant Sciences (3 Credits)
A capstone course based on interactions with plant science professionals and student-led class discussions. Students will apply their knowledge and experience to practical issues in the discipline, further develop critical thinking ability, and enhance their communication, teamwork, and professional skills. Topics will include nutrient management, integrated pest management, plant interactions with urban and rural ecosystems, planning of public grounds, plant biotechnology, and teaching skills.
Prerequisite: Minimum grade of C- in PLSC110 and PLSC111; or minimum grade of C- in PLSC112 and PLSC113; or minimum grade of C- in PLSC201 and PLSC206; or permission of instructor.
Recommended: ENGL393 and ENST200; and (PLSC389 or PLSC399).
Restriction: Senior standing or higher.

PLSC461 Cultural Management of Nursery and Greenhouse Systems: Substrates (1 Credit)
One of three 1-credit modules (PLSC461, PLSC462 and PLSC464)covering the management techniques used in the intensive culture of plants in commercial operations. Specifically, this module covers the composition, handling, physical and chemical properties of substrates and how they should be managed to maximize plant growth.
Credit Only Granted for: PLSC461 or PLSC489T.
Formerly: PLSC489T.
Additional Information: Course material is delivered primarily online, but a four hour face-to-face lecture/lab will be held at the end of the module. PLSC461, PLSC462 and PLSC464 will be taught sequentially during the semester.

PLSC462 Cultural Management of Nursery and Greenhouse Systems; Irrigation (1 Credit)
One of three 1-credit modules (PLSC461, PLSC462 and PLSC464) covering the management techniques used in the intensive culture of plants in commercial operations. Specifically, this module covers water quantity and quality issues, water supply (basic hydraulics), irrigation system design and irrigation system evaluation (performance) to maximize water application efficiency.
Credit Only Granted for: PLSC462 or PLSC489W.
Formerly: PLSC489W.
Additional Information: Course material is delivered primarily online, but a four hour face-to-face lecture/lab will be held at the end of the module. PLSC 461, 462 and 464 will be taught sequentially during the semester.

PLSC464 Cultural Management of Nursery and Greenhouse Systems: Nutrients (1 Credit)
One of three 1-credit modules (PLSC461, PLSC462 and PLSC464) covering the management techniques used in the intensive culture of plants in commercial operations. Specifically, this module covers the basics of fertilization, different fertilization strategies and nutrient use and efficiency, to optimize nutrient application practices in intensive plant production systems.
Credit Only Granted for: PLSC464 or PLSC489Z.
Formerly: PLSC489Z.
Additional Information: Course material is delivered primarily online, but a four hour face-to-face lecture/lab will be held at the end of the module. PLSC 461, 462 and 464 will be taught sequentially during the semester.

PLSC471 Forest Ecology (3 Credits)
An understanding of the forest ecosystem, its structure and the processes that regulate it are provided. It also considers changes that occur in forests, the interaction of environment and genetics in promoting ecosystem sustainability, and the role of human influences on urban forest ecosystems.
Prerequisite: Minimum grade of C- in PLSC201; or minimum grade of C- in BSCI160 and (BSCI180 or BSCI161).

PLSC472 Capstone-Urban Forest Project Management (3 Credits)
Students will synthesize the ideas and information learned from their studies in urban forestry. Working in teams, students will complete projects involving real-world issues. Student projects will use scientific, social, political and ethical considerations in an interdisciplinary approach to provide solutions to their problem.
Prerequisite: Minimum grade of C- in ENST200, PLSC272, and PLSC471.
Restriction: Senior standing or higher; and must be in a major within AGNR-Plant Science & Landscape Architecture department.

PLSC473 Woody Plant Physiology (3 Credits)
Concentration is placed on physiological processes important to woody plant growth and development. Emphasis will be placed on current concepts and theories of how woody plants grow and develop, and the critical assessment of current research in woody plant physiology. Course readings will include textbook assignments and selected papers from the current scientific literature.
Prerequisite: Minimum grade of C- in PLSC400 or BSCI442; or minimum grade of C- in PLSC201 and PLSC206; or students who have taken courses with comparable content may contact the department.

PLSC476 Data Wrangling and Visualization Using R (3 Credits)
Through a combination of lecture, hands-on demos, quizzes, and increasingly independent coding exercises and a project, you will learn the fundamentals of using the R statistical language. You will gain experience getting your data into R, wrangling it into the form needed for your chosen analysis, visualizing the data, getting your results out of those analyses, and documenting your workflow greater scientific community. Instead of focusing on a few specific types of analyses, you will learn basic skills and general principles that you can use to analyze data for your field.
Credit Only Granted for: PLSC489R or PLSC476 .
Formerly: PLSC489R.

PLSC480 Urban Ecology (3 Credits)
Cities are rapidly increasing in number and size across the globe, transforming local ecosystems. This course examines urban environments as coupled social-ecological systems at multiple scales, from streets and parks to urban landscapes patterns and global patterns of biodiversity. Ecological principles are applied in the urban context, including habitats, biodiversity, ecological processes, and ecosystem services of urban environments, with applications to problems in urban land management, decision-making and design.
Prerequisite: Minimum grade of C- in PLSC471, ENST360, BSCI363, or BSCI160; or other coursework/experience considered for instructor permission.
Additional Information: Class will be held both on campus and at other locations such as the U.S. Botanic Garden, local parks, and urban and suburban locations off campus.

PLSC481 Vegetation Assessment and Analysis (2 Credits)
An overview of vegetation assessment through the collection of data in the field (e.g. plots and transects) and the analysis of existing data and remotely detected images (e.g. Aerial photographs and GIS layers).
Prerequisite: PLSC110 and PLSC111; or BSCI160 and (BSCI180 or BSCI161); or permission of instructor.
Recommended: PLSC201, BSCI360, PLSC226, or PLSC471.

PLSC489 Special Topics in Plant Science (1-3 Credits)
A lecture and or laboratory series organized to study a selected phase of Plant Science not covered by existing courses. Credit according to time scheduled and organization of the course.
Repeatable to: 6 credits if content differs.