PLSC - PLANT SCIENCES

PLSC100 Introduction to Horticulture (4 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.

PLSC101 Introductory Crop Science (4 Credits)
Major crop plants including: anatomy, physiology, morphology, history, use, adaptation, culture, improvement and economic importance.

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: PLSC100, PLSC101, or BSCI105; or (BSCI170 and BSCI171).

PLSC120 Mushrooms and Molds (3 Credits)
Students will learn about how essential fungi (mushroom, molds, and allies) are in this world and how they affect our daily lives. They will learn how fungi interact with animals, plants and other organisms in positive and negative ways. Also, they will study the importance of fungi in biotechnology and food and how they have shaped many societies throughout history.

PLSC125 Feeding Nine Billion by 2050: Food Security and Crop Protection (3 Credits)
A big question in global food security is "how can we feed 9 billion people in 2050?" This course will stimulate creative thinking about possible solutions particularly from the crop production perspective. The instructor 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 biofuel production and GM crops on food security, and novel strategies that can enhance crop protection for improving food security.

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 (4 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. Prerequisite: PLSC100; or PLSC101. And CHEM103; or 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: BSCI103 or BSCI105; or (BSCI170 and BSCI171).

PLSC204 Fundamentals of Agricultural Mechanics (3 Credits)
A comprehensive course that teaches the fundamentals of agricultural related mechanics. Lecture and lab exercises will cover the broad range of topics associated with agricultural mechanics including electricity, plumbing, welding processes, and wood and metal working applications. Emphasis will be given to the design and installation of electrical circuits. It will also include project planning and implementation including development of safety protocols for each area of study and introduction of GPS equipment and software for survey data collection. Credit Only Granted for: ENBE200 or PLSC204. Formerly: ENBE200.

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.

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: PLSC201; or permission of instructor.

PLSC235 Irrigation and Drainage (3 Credits)
An overview of U.S. and state water doctrines and plant water use rates. Irrigation systems for residential and athletic field use will be discussed covering such topics as hydraulics, sprinkler spacing, pipe selection and sizing, pumps, controllers, valves, and irrigation trouble shooting. Surface and subsurface drainage for turfgrass sites will also be covered. Credit Only Granted for: PLSC235 or PLSC489I. Formerly: PLSC489I.

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: PLSC100 or PLSC101. 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.
Prerequisite: PLSC100.

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.
Prerequisite: PLSC100 and PLSC253; or permission of instructor.

PLSC255 Landscape Design and Implementation (4 Credits)
Principles of landscape architecture applied to residential and commercial landscaping: informal and formal designs and plan graphics.
Prerequisite: PLSC253 or PLSC254.
Restriction: Must not have completed LARC141; and must not have completed LARC341.

PLSC271 Plant Propagation (3 Credits)
A study of the principles and practices in the propagation of plants.
Prerequisite: PLSC100; or (BSCI170 and BSCI171); or BSCI105.

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.
Prerequisite: PLSC100 and PLSC171.
Recommended: ENST200.

PLSC275 Fundamentals of Agricultural Chemistry (3 Credits)
An in-depth discussion of chemistry targeted to students enrolled in plant and animal management curricula offered in AGNR. Covers the nomenclature and basic functional groups in organic chemistry, secondary plant metabolites, basic tenets of organic agriculture and the creation of genetically-modified plants. The chemistry, handling and usage of agricultural pesticides is also discussed.
Prerequisite: CHEM131 and CHEM132. And PLSC100; or PLSC101; or (BSCI160 and BSCI161); or (BSCI170 and BSCI171); or BSCI105; or BSCI106.
Restriction: Must not have completed CHEM104 or CHEM105. And must be in a major within the AGNR-Plant Science & Landscape Architecture department; or must be in a major within the AGNR-Animal & Avian Sciences department; or permission of instructor.
Credit Only Granted for: PLSC275, CHEM104, or CHEM105.

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.
Prerequisite: BSCI170 and BSCI171; or BSCI105; or students who have taken courses with comparable content may contact the department.

PLSC305 Introduction to Turf Management (3 Credits)
Principles of turf culture. Identification and uses of turfgrass species; turfgrass fertilization, cultivation, mowing and establishment; and the identification of turf pests.

PLSC321 Landscape Structures and Materials (3 Credits)
An examination of the use, properties, and detailing of materials used in landscape construction. The use and design of structures in the landscape.
Prerequisite: PLSC320.
Credit Only Granted for: LARC321 or PLSC321.

PLSC322 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.

PLSC323 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: 12 credits in PLSC courses; and permission of AGNR-Plant Science & Landscape Architecture department.
Restriction: Must be in Plant Sciences program.
Repeatable to: 6 credits.

PLSC400 Plant Physiology (4 Credits)
A survey of plant physiology and development responses and adaptation to the environment.
Prerequisite: BSCI170 and BSCI171; or BSCI105; or PLSC201. And CHEM231 and CHEM232; or CHEM237; or permission of AGNR-Plant Science & Landscape Architecture department; or permission of CMNS-Biological Sciences UG Program. 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 agronomic 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: PLSC305.

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: BSCI170 and BSCI171; or PLSC201. And CHEM231 and CHEM232; or CHEM237; or permission of AGNR-Plant Science & Landscape Architecture department.

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; or permission of instructor.
Recommended: BSCI361 or PLSC471; or any BSCI or ENST ecology course.
Credit Only Granted for: PLSC405 or PLSC605.

PLSC407 Advanced Crop Science (3 Credits)
A study of principles of production for forage crops, corn, small grains, rice, millets, sorghums, soybeans and other oil seed crops. Their seed production, processing, distribution and the current federal and state seed control programs for these agronomic crops will also be discussed.
Prerequisite: PLSC101. And BSCI170 and BSCI171; or BSCI105.

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: BSCI170; and BSCI171. Or PLSC201; or permission of AGNR-Plant Science & Landscape Architecture department.

PLSC415 Diseases of Trees and Shrubs (3 Credits)
Diseases on woody plants commonly planted or native to Mid-Atlantic region. Biology, identification and management of important plant pathogens.
Prerequisite: PLSC100 and PLSC201; or permission of instructor.
Credit Only Granted for: PLSC415 or PLSC489E.
Formerly: PLSC489E.

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: CHEM131, CHEM132, and PLSC201; 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.

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: CHEM131 and CHEM132; or 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.
Prerequisite: PLSC201 and PLSC202; and must have completed or be concurrently enrolled in BSCI442.
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:** PLSC201, PLSC271, and ENST200; or students who have taken courses with comparable content may contact the department.
**Restriction:** Junior standing or higher.

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:** PLSC100 or PLSC101; and (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:** PLSC100, PLSC101, or PLSC201; or permission of instructor.
**Recommended:** ENGL393 and ENST200; and (PLSC389 or PLSC399).
**Restriction:** Senior standing or higher. And must be in a major within the AGNR-Plant Science & Landscape Architecture department; or must be in another related major.

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.
**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. PLSC 461, 462 and 464 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:** PLSC201; or (BSCI160 and BSCI161); or BSCI106.

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:** 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:** BSCI442 or PLSC201; or students who have taken courses with comparable content may contact the department.
**Credit Only Granted for:** ENST406 or PLSC475.

PLSC475 Applied Forestry Practices (3 Credits)
Focuses on the applied dynamics of a set of forest practices such as management, silviculture, measurement and inventory, preparation of a management plan, etc, within the urban/rural interface. Several field trips are included to gain hands-on experience.
**Prerequisite:** ENST200. And ENST360; or PLSC471. Cross-listed with ENST406.
**Credit Only Granted for:** ENST406 or PLSC475.
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:** 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:** PLSC100; or (BSCI160 and BSCI161); or BSCI106; 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.