

# PLANT BIOLOGY, ECOLOGY, AND EVOLUTION

## Courses

### PBIO 1052 How Plants Shaped Our World (LN)

**Description:** Experience the connections between plants and everything in our world - from food and clothing to history and art. Learn why the first physicians were botanists. See how the search for black pepper led to the discovery of a new world and to masterpieces by Dutch painters. Discover how plants work by growing and experimenting with them.

**Credit hours:** 2

**Contact hours:** Lecture: 1 Lab: 2 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**General Education and other Course Attributes:** Laboratory-Based Inquiry, Natural Science Reasoning

### PBIO 1404 Plant Biology (LN)

**Description:** Basic concepts in the biology of plants from the perspective of structure and function, ecology and evolution, and diversity. Students gain experience with the process of science by proposing hypotheses, designing and conducting experiments and interpreting data. Previously offered as BOT 1404, BIOL 1404, BIOL 1403, and BISC 1403.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 2 Contact: 5

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**General Education and other Course Attributes:** Laboratory-Based Inquiry, Natural Science Reasoning

### PBIO 2110 Special Topics in Plant Biology

**Prerequisites:** Consent of instructor.

**Description:** Special studies in any area of plant biology. Offered for variable credit, 1-6 credit hours, maximum of 15 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Biology

### PBIO 2200 Undergraduate Research

**Prerequisites:** Consent of instructor.

**Description:** Undergraduate research problems in plant biology. Graded on a pass/fail basis. Offered for variable credit, 1-6 credit hours, maximum of 15 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Biology

### PBIO 2403 Introduction to Plant Molecular Biology

**Prerequisites:** PBIO 1404 or BIOL 1113 and BIOL 1111 or BIOL 1114.

**Description:** Concepts, principles, and themes in plant molecular biology, including structures and functions of biomolecules, representative molecular reactions, and regulations of such reactions in everyday plant life.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Biology

### PBIO 2890 Honors Experience in Plant Biology

**Prerequisites:** Honors Program participation and concurrent enrollment in a designated BIOL or PBIO course.

**Description:** A supplemental Honors experience in Plant Biology to partner concurrently with designated upper-division BIOL or PBIO course(s). The course adds a different intellectual dimension to the designated course. Same course as PBIO 3890. Offered for fixed credit, 1 credit hour, maximum of 6 credit hours.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Biology

**General Education and other Course Attributes:** Honors Credit

### PBIO 3024 Plant Diversity

**Prerequisites:** BOT 1404 or equivalent.

**Description:** Forms and life histories of selected plants with emphasis on some of the less familiar forms. The diversity of plant forms as well as basic similarities in life histories; importance of each form to humans and their environment. Previously offered as BOT 3024.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 3 Contact: 6

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

### PBIO 3110 Special Topics in Plant Biology

**Prerequisites:** Consent of instructor.

**Description:** Special studies in any area of plant biology. Offered for variable credit, 1-6 credit hours, maximum of 15 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Biology

### PBIO 3114 Plant Taxonomy

**Prerequisites:** PBIO 1404 or equivalent.

**Description:** Survey of vascular plant families in a phylogenetic framework, and the morphological characters that define them. Principles and practice of plant classification theory and methods. Lab focuses on the identification of species that comprise the Oklahoma flora. Previously offered as BOT 3114.

**Credit hours:** 4

**Contact hours:** Lecture: 2 Lab: 4 Contact: 6

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 3253 Environment and Society (N)**

**Prerequisites:** At least one college level science course strongly recommended.

**Description:** The environmental impacts of human activities and population growth on the natural world, and possible solutions. Previously offered as BOT 3253.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Biology

**General Education and other Course Attributes:** Natural Science Reasoning

**PBIO 3263 Plants and People (N)**

**Description:** Study of how plant use has changed the course of world history. This includes the uses of plants and plant products for food and beverages, shelter, fiber, and medicinal and pharmaceutical purposes. Previously offered as BOT 3263.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Biology

**General Education and other Course Attributes:** Natural Science Reasoning

**PBIO 3273 Medical Botany (N)**

**Description:** Study of plants as a source of medicines, psychoactive compounds and poisons. These topics will be explored in the context of modern western medicine as well as traditional health systems and complementary alternative medicine. Previously offered as BOT 3273.

**Credit hours:** 3

**Contact hours:** Lecture: 3 Contact: 3

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Biology

**General Education and other Course Attributes:** Natural Science Reasoning

**PBIO 3403 Hopeful Monsters: Laboratory Analysis of Plant Mutants**

**Prerequisites:** PBIO 1404 or BIOL 1113.

**Description:** The course will focus on the analysis of selected mutants of the model plant *Arabidopsis thaliana*. The mutations affect different parts of the plant, including altered cell types, organ identity changes, malformed tissues and organs, unusual organ or seed sizes, and altered fertility. There are seven modules, each consisting of directed and independent analyses of mutations. Light microscopy will be the primary method for the analysis of the mutations.

**Credit hours:** 3

**Contact hours:** Lecture: 1 Lab: 4 Contact: 5

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 3553 Fungi: Myths and More**

**Prerequisites:** BIOL 1114 or (BIOL 1113 and BIOL 1111).

**Description:** This course explores fungal biology and its roles in the environment and impacts on the health and nutrition of plants, animals and humans. Topics include the ethnomycological and industrial uses of fungi in foods, fermentations, medicines, and intoxicants, and the colorful folklore and myths associated with these diverse, enigmatic organisms. Laboratory instruction includes microscopy, microbiological methods, mushroom cultivation, and identification of microfungi and wild mushrooms. Same course as PLP 3553. Previously offered as BOT 3553.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 2 Contact: 4

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 3890 Advanced Honors Experience in Plant Biology**

**Prerequisites:** Honors Program participation and concurrent enrollment in a designated BIOL or PBIO course.

**Description:** A supplemental Honors experience in Plant Biology to partner concurrently with designated upper-division BIOL or PBIO course(s). The course adds a different intellectual dimension to the designated course. Same course as PBIO 2890. Offered for fixed credit, 1 credit hour, maximum of 6 credit hours.

**Credit hours:** 1

**Contact hours:** Lecture: 1 Contact: 1

**Levels:** Undergraduate

**Schedule types:** Lecture

**Department/School:** Biology

**General Education and other Course Attributes:** Honors Credit

**PBIO 4005 Field Botany**

**Prerequisites:** PBIO 1404 or equivalent.

**Description:** Botanical field techniques, the vegetation of North America, and the flora of Oklahoma. Terminology of description, use of taxonomic keys, techniques of specimen preservation, field recognition of plant taxa and communities and controlling ecological factors, economic and wildlife significance of dominant taxa, principles of classification and nomenclature. Three weekend field trips required. May not be used for degree credit with PBIO 5003. Previously offered as BOT 3005.

**Credit hours:** 5

**Contact hours:** Lecture: 3 Lab: 4 Contact: 7

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 4013 Biological Microtechnique**

**Prerequisites:** PBIO 1404 or BIOL 1604.

**Description:** Theories, principles, and methods related to the usage of the light microscope and to the preparation of biological materials for light microscopic examination. May not be used for degree credit with PBIO 5013. Previously offered as BOT 3013.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 3 Contact: 5

**Levels:** Undergraduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 4110 Special Topics in Plant Biology****Prerequisites:** Consent of instructor.**Description:** Special studies in any area of plant biology. Offered for variable credit, 1-6 credit hours, maximum of 15 credit hours.**Credit hours:** 1-6**Contact hours:** Contact: 1-6 Other: 1-6**Levels:** Undergraduate**Schedule types:** Discussion**Department/School:** Biology**PBIO 4233 Plant Anatomy****Prerequisites:** BOT 1404 or equivalent.**Description:** Structures of cells, tissues and organs of plants and the developmental, phylogenetic, and functional contexts of the structures. May not be used for degree credit with PBIO 5233. Previously offered as BOT 3233.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Undergraduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 4400 Undergraduate Research****Prerequisites:** Consent of instructor.**Description:** Undergraduate research problems in plant biology. Previously offered as BOT 4400. Offered for variable credit, 1-6 credit hours, maximum of 15 credit hours.**Credit hours:** 1-6**Contact hours:** Contact: 1-6 Other: 1-6**Levels:** Undergraduate**Schedule types:** Discussion**Department/School:** Biology**PBIO 4423 Plant Mineral Nutrition****Prerequisites:** PBIO 4463 or concurrent enrollment.**Description:** Uptake, translocation, metabolism, and biochemical function of mineral nutrients in higher plants. May not be used for degree credit with PBIO 5423. Previously offered as BOT 4423.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Biology**PBIO 4462 Plant Physiology Laboratory****Prerequisites:** PBIO 4463 or PBIO 5463 or concurrent enrollment.**Description:** Skills in techniques for working with plants, experiments involving nutrition, respiration, photosynthesis, water relations, translocation, hormones, growth and development. Previously offered as BOT 3460 and BOT 3462.**Credit hours:** 2**Contact hours:** Lab: 4 Contact: 4**Levels:** Undergraduate**Schedule types:** Lab**Department/School:** Biology**PBIO 4463 Plant Physiology****Prerequisites:** BOT 1404 or equivalent.**Description:** Plant subcellular structure, water relations, water absorption and ascent of sap, translocation, gaseous exchange, nutrition, enzymes, respiration, photosynthesis, growth, development, reproduction, tropisms, hormones, dormancy and seed germination. May not be used for degree credit with PBIO 5463. Previously offered as BOT 3463.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Biology**PBIO 4524 Biological Laboratory Instrumentation****Prerequisites:** CHEM 1515 or equivalent and (BOT 1404 or MICR 2123 or BIOL 1604 or equivalents or consent of instructor).**Description:** Lecture and laboratory course in biological instrumentation use, theory, experimental design, maintenance, and troubleshooting. Topics include liquid handling systems, pH/ISE meters, electrophoresis, microcontrollers, spectrophotometers, centrifuges, chromatography, thermocyclers, and DNA sequencers. Same course as BIOL 4524, MICR 4524.**Credit hours:** 4**Contact hours:** Lecture: 2 Lab: 4 Contact: 6**Levels:** Undergraduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 4553 Molecular Phylogenetic Analysis****Prerequisites:** Undergraduate genetics strongly recommended.**Description:** Covers the use of molecular sequence data to construct evolutionary trees. It integrates theory and computer applications to answer questions involving species relationships, gene evolution, molecular evolution and morphological change, co-evolution, and biogeographic relationships. May not be used for degree credit with PBIO 5553.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Undergraduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 4654 Plant Secondary Metabolism****Prerequisites:** PBIO 1404.**Description:** This course describes the biochemical pathways and functions of plant secondary metabolites, and how they have been used for medical, pharmaceutical, and agricultural research and industry. Same course as PBIO 5654.**Credit hours:** 4**Contact hours:** Lecture: 3 Lab: 3 Contact: 6**Levels:** Undergraduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology

**PBIO 4800 Senior Honors Thesis**

**Prerequisites:** Departmental invitation, senior standing, Honors Program participation.

**Description:** A research project under the direction of a faculty member resulting in a written report to be judged by a second faculty member as well. An oral presentation made at a departmental seminar. Required for graduation with departmental honors in plant biology. Previously offered as BOT 4993. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Biology

**General Education and other Course Attributes:** Honors Credit

**PBIO 4910 Internship in Plant Biology**

**Prerequisites:** Specified hours of documented plant biology work experience.

**Description:** Supervised experience in an approved work situation related to future career in the plant biology field. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Biology

**PBIO 4990 Independent Study in Plant Biology**

**Prerequisites:** Consent of instructor.

**Description:** Independent study under the supervision of a faculty member. This will include readings and discussion on a selected topic agreed upon between the student and instructor. Previously offered as BOT 4990. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Undergraduate

**Schedule types:** Discussion

**Department/School:** Biology

**PBIO 5000 Master's Thesis**

**Description:** Thesis work for the MS degree. Previously offered as BOT 5000. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Graduate

**Schedule types:** Discussion

**Department/School:** Biology

**PBIO 5003 Field Botany**

**Prerequisites:** PBIO 1404 or equivalent.

**Description:** Botanical field techniques, the vegetation of North America, and the flora of Oklahoma. Terminology of description, use of taxonomic keys, techniques of specimen preservation, field recognition of plant taxa and communities and controlling ecological factors, economic and wildlife significance of dominant taxa, principles of classification and nomenclature. Three weekend field trips required. May not be used for degree credit with PBIO 4005.

**Credit hours:** 3

**Contact hours:** Lecture: 1 Lab: 4 Contact: 5

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 5013 Biological Microtechnique**

**Prerequisites:** PBIO 1404 or BIOL 1604.

**Description:** Theories, principles, and methods related to the usage of the light microscope and to the preparation of biological materials for light microscopic examination. May not be used for degree credit with PBIO 4013.

**Credit hours:** 3

**Contact hours:** Lecture: 2 Lab: 2 Contact: 4

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 5104 Mycology**

**Prerequisites:** Graduate standing.

**Description:** A systematic study of the fungi, with emphasis on taxonomy, comparative morphology, and fungal biology. Same course as PLP 5104. Previously offered as BOT 5104.

**Credit hours:** 4

**Contact hours:** Lecture: 3 Lab: 2 Contact: 5

**Levels:** Graduate

**Schedule types:** Lab, Lecture, Combined lecture and lab

**Department/School:** Biology

**PBIO 5110 Special Topics in Plant Biology**

**Prerequisites:** Consent of instructor.

**Description:** Special studies in any area of plant biology. Previously offered as BOT 5110. Offered for variable credit, 1-5 credit hours, maximum of 24 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Graduate

**Schedule types:** Discussion

**Department/School:** Biology

**PBIO 5210 Research in Plant Biology**

**Prerequisites:** Consent of instructor.

**Description:** Independent research in any area of plant biology. Previously offered as BOT 5210. Offered for variable credit, 1-6 credit hours, maximum of 15 credit hours.

**Credit hours:** 1-6

**Contact hours:** Contact: 1-6 Other: 1-6

**Levels:** Graduate

**Schedule types:** Discussion

**Department/School:** Biology

**PBIO 5233 Plant Anatomy****Prerequisites:** PBIO 1404.**Description:** Structures of cells, tissues and organs of plants and the developmental, phylogenetic, and functional contexts of the structures. May not be used for degree credit with PBIO 4233.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 5423 Plant Mineral Nutrition****Prerequisites:** BOT 4463 or concurrent enrollment.**Description:** Uptake, translocation, metabolism, and biochemical function of mineral nutrients in higher plants. May not be used for degree credit with PBIO 4423. Previously offered as BOT 5423.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biology**PBIO 5463 Plant Physiology****Prerequisites:** PBIO 1404 or equivalent.**Description:** Plant subcellular structure, water relations, water absorption and ascent of sap, translocation, gaseous exchange, nutrition, enzymes, respiration, photosynthesis, growth, development, reproduction, tropisms, hormones, dormancy and seed germination. Previously offered as BOT 3463. May not be used for degree credit with PBIO 4463.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biology**PBIO 5524 Biological Instrumentation****Prerequisites:** CHEM 1515 or equivalent and (BOT 1404 or MICR 2123 or BIOL 1604 or equivalents or consent of instructor).**Description:** Lecture and laboratory course in biological instrumentation use, theory, experimental design, maintenance, and troubleshooting. Topics include liquid handling systems, pH/ISE meters, electrophoresis, spectrophotometers, centrifuges, chromatography, thermocyclers, and DNA sequencers. Same course as BIOL 5524 and MICR 5524.**Credit hours:** 4**Contact hours:** Lecture: 2 Lab: 4 Contact: 6**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 5541 Phylogenomics****Description:** Current topics in the theory and application of genome and transcriptome sequencing to phylogenetics, prediction of gene function, and evolution of genes. Previously offered as BOT 5541.**Credit hours:** 1**Contact hours:** Contact: 1 Other: 1**Levels:** Graduate**Schedule types:** Discussion**Department/School:** Biology**PBIO 5553 Molecular Phylogenetic Analysis****Prerequisites:** Undergraduate genetics strongly recommended.**Description:** Covers the use of molecular sequence data to construct evolutionary trees. It integrates theory and computer applications to answer questions involving species relationships, gene evolution, molecular evolution and morphological change, co-evolution, and biogeographic relationships. May not be used for degree credit with PBIO 4553. Previously offered as BOT 5553.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2 Contact: 4**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 5563 Plant Ecological Genetics****Prerequisites:** Two of the following courses or their equivalent: BIOL 3023, BIOL 3034, and BIOL 4133.**Description:** Basic concepts in plant population and quantitative genetics, focusing on techniques that reveal the genetic structure and the adaptive value of ecologically relevant traits. Previously offered as BOT 5563.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biology**PBIO 5654 Plant Secondary Metabolism****Prerequisites:** PBIO 1404.**Description:** This course describes the biochemical pathways and functions of plant secondary metabolites, and how they have been used for medical, pharmaceutical, and agricultural research and industry. Same course as PBIO 4654.**Credit hours:** 4**Contact hours:** Lecture: 3 Lab: 3 Contact: 6**Levels:** Graduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Biology**PBIO 5813 Plant Developmental Genetics****Prerequisites:** BIOL 3023 or equivalent.**Description:** Discussion of the genetic and molecular factors that regulate reproductive and vegetative development in flowering plants. Emphasis on recent publications that deal with model genetic systems and plants of economic significance. Previously offered as BOT 5813.**Credit hours:** 3**Contact hours:** Lecture: 3 Contact: 3**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biology**PBIO 5850 Plant Biology Seminar****Description:** Weekly one-hour seminar series of invited and internal speakers. Plant Sciences MS and Plant Sciences (Plant Biology) PhD students are required to present a minimum of two seminars, including one on thesis or dissertation results. Previously offered as BOT 5850. Offered for fixed credit, 1 credit hour, maximum of 6 credit hours.**Credit hours:** 1**Contact hours:** Lecture: 1 Contact: 1**Levels:** Graduate**Schedule types:** Lecture**Department/School:** Biology

**PBIO 5910 Internship in Plant Biology**

**Prerequisites:** Specified hours of documented plant biology work experience.

**Description:** Supervised experience in an approved work situation related to future career in the plant biology field. Graded on a pass/fail basis. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.

**Credit hours:** 1-3

**Contact hours:** Contact: 1-3 Other: 1-3

**Levels:** Graduate

**Schedule types:** Discussion

**Department/School:** Biology

**PBIO 6000 Doctoral Research**

**Description:** Independent research for the doctoral dissertation.

Previously offered as BOT 6000. Offered for variable credit, 1-15 credit hours, maximum of 60 credit hours.

**Credit hours:** 1-15

**Contact hours:** Contact: 1-15 Other: 1-15

**Levels:** Graduate

**Schedule types:** Discussion

**Department/School:** Biology