

PBIO-PLANT BIOLOGY

- PBIO 1114 General Botany 4 Credit Hours**
 Previous course in chemistry (high school or college) recommended. Fulfills Arts and Sciences' biological science requirement. Basic processes and structures in plants; their relation to factors in the environment; reproduction; heredity, heritable and nonheritable variations in plants and their causes and consequences are studied. Scientific procedures are acquired through application and discussion. Laboratory (F, Sp, Su) [II-NSL].
- PBIO 2404 Ecology & Environmental Quality 4 Credit Hours**
 (Crosslisted with BIOL 2404) Prerequisite: sophomore standing. Study of ecological principles and their applications to human systems, study of population, air pollution, water pollution, energy issues, etc. Laboratory exercises focus on learning scientific methods of measurement of environmental quality factors. This course does not count for major credit in Plant Biology. Laboratory. (Sp) [II-NSL].
- PBIO 2503 Plant Care and Cultivation 3 Credit Hours**
 Prerequisite: PBIO 1114, or Biology 1005, or Biology 1114, or Biology 1134, or any introductory college Biology course. Application of the principles of botany to the cultivation, propagation, and maintenance of plants grown in home environments. Particular attention is given to the effects of light, water, minerals, and soil factors on plant growth; seed and vegetative propagation; pest control; and proper conditions for cultivated plants. (F) [II-NS].
- PBIO 3113 Cell Biology 3 Credit Hours**
 (Crosslisted with MBIO and BIOL 3113) Prerequisite: 1114, or Biology 1134, or Biology 1114 and 1121, or Biology 1124; and Chemistry 3053. Introduction to the cell as a unit of life. A chemical and physical comparison of prokaryotic and eukaryotic cells to include a discussion of cell metabolism, types of metabolic regulation and an analysis of ultrastructure. Emphasis will be placed on the dynamic changes in metabolism and ultrastructure which occur during the life of a cell. (F, Sp)
- PBIO 3163 Economic Botany 3 Credit Hours**
 Prerequisite: 1114, or Biology 1134, or Biology 1005, or any introductory biology course. A survey of plants and plant products used in industry, drug plants and drugs, and especially food plants and food adjuncts. Origin of agriculture, domestication and evolution of crop plants, and uses of plants in different cultures are emphasized. (F) [IV-WC].
- PBIO 3333 Genetics 3 Credit Hours**
 (Crosslisted with BIOL 3333) Prerequisite: eight hours of ZOO/BIOL and/or PBIO and/or MBIO, or five hours of ZOO/BIOL or PBIO or MBIO and permission of instructor. Principles of inheritance at gene, chromosome and population levels; nature of the genetic material and its involvement in the determination of structure and function. No laboratory. (F, Sp)
- PBIO 3440 Mentored Research Experience 3 Credit Hours**
 0 to 3 hours. Prerequisites: ENGL 1113 or equivalent, and permission of instructor. May be repeated; maximum credit 12 hours. For the inquisitive student to apply the scholarly processes of the discipline to a research or creative project under the mentorship of a faculty member. Student and instructor should complete an Undergraduate Research & Creative Projects (URCP) Mentoring Agreement and file it with the URCP office. Not for honors credit. (F, Sp, Su)
- PBIO 3451 Methods in Plant Ecology 1 Credit Hour**
 Prerequisite: Corequisite: PBIO 3453. Methodology in plant physiological, population, community and ecosystem ecology will be covered. Emphasis will be on actual field or laboratory experience and the applicability of these methods to other areas of ecology. Laboratory. (F)
- PBIO 3453 Principles of Plant Ecology 3 Credit Hours**
 Prerequisite: PBIO 1114 or BIOL 1134. Introduction to physiological, population and community ecology. Emphasis is placed on environmental factors, disturbance and succession and how these factors affect species diversity and landscape patterns. One field trip. (F)
- PBIO 3673 Practical Bioinformatics 3 Credit Hours**
 (Crosslisted with MBIO 3673) Prerequisite: PBIO 1114, or MBIO 2815, or MBIO 3813, or BIOL 1005, or BIOL 1114, or equivalent introductory biology course, and junior standing, or instructor permission. Study of the use of computers to analyze and interpret various types of biological data. Topics covered will include accessing genomics databases, aligning DNA and protein sequences, searching genomic databases for similar sequences, analyzing protein structure, and building molecular phylogenies. Classes will emphasize group work and in-class computer exercises in a highly interactive environment. (Sp)
- PBIO 3960 Honors Reading (HONORS) 1-3 Credit Hours**
 1 to 3 hours. Prerequisite: admission to Honors Program. May be repeated; maximum credit six hours. (F, Sp, Su)
- PBIO 3970 Honors Seminar 1-3 Credit Hours**
 1 to 3 hours. Prerequisite: admission to Honors Program; May be repeated; maximum credit six hours. Subjects covered vary. Deals with concepts not usually treated in regular courses.
- PBIO 3980 Honors Research (HONORS) 1-3 Credit Hours**
 1 to 3 hours. Prerequisite: admission to Honors Program; May be repeated; maximum credit six hours. Provides an opportunity for the gifted Honors candidate to work on a special project in the student's field. (F, Sp, Su)
- PBIO 3990 Independent Study 1-3 Credit Hours**
 1 to 3 hours. Prerequisite: one course in general area to be studied; permission of instructor and department; May be repeated; maximum credit six hours. Contracted independent study for topic not currently offered in regularly scheduled courses. Independent study may include library and/or laboratory research and field projects. (F, Sp, Su)
- PBIO G4114 Principles of Plant Physiology 4 Credit Hours**
 Prerequisite: PBIO 1114 and CHEM 3053 or permission of instructor. Plant Physiology is the study of how plants grow and develop, respond to biotic and abiotic factors in their environments, convert solar energy to chemical energy, and generally how plants go about their business. Modern plant physiology is a fairly all-inclusive discipline and incorporates plant anatomy and morphology, biochemistry, genetics, molecular biology, etc. Laboratory. (F)
- PBIO G4283 Plant Anatomy 3 Credit Hours**
 Prerequisite: seven hours in biology or permission of instructor. The structure and development of the organs of vascular plants as revealed by observations of representative living and prepared specimens. Theories concerning the evolution of organs and internal structure. (Sp odd-numbered years)
- PBIO 4313 Biotechnology Applications 3 Credit Hours**
 (Crosslisted with MBIO 4313) Prerequisite: PBIO/BIOL 3113 or PBIO/BIOL 3333 or PBIO/MBIO/BIOL 4843 or PBIO/MBIO 4873 or Chemistry 3653 or permission of instructor. For students who possess a working knowledge of molecular biology. Focus on developing familiarity with methods used in biotechnology to address societal challenges. Students will put into practice central methods of biotechnology, gaining practical skills for use in future careers in laboratory science, particularly methods relevant to pharmaceutical production, agricultural improvement, bio-fuel production, and medical and forensic diagnostics, among others. (Sp)

- PBIO 4334 Horticulture** **4 Credit Hours**
Prerequisite: PBIO 1114 and BIOL 1134, or permission of the instructor. Application of botanical principles to the cultivation, propagation, and maintenance of plants. Attention is given to the evolutionary history of the plants and their needs in cultivation. Lab activities cover growth and propagation of plants in a greenhouse environment, constructing and testing hypotheses for how plant growth is affected by different conditions, and using R to examine resulting data. Laboratory. (Irreg.)
- PBIO 4534 Plant Systematics** **4 Credit Hours**
(Slashlisted with PBIO 5534) Prerequisite: PBIO 1114 and BIOL 1134 or permission of the instructor. Introduction to the evolution and identification of vascular plants with emphasis on the origin and evolution of the Oklahoma flora. Laboratory activities stress identification skills, terminology, field techniques, and family recognition for the flora of Oklahoma. Field trips. Laboratory. No student may earn credit for both 4534 and 5534. (Irreg.)
- PBIO 4630 PBIO Internship** **1-6 Credit Hours**
1 to 6 hours. (Crosslisted with MBIO 4630) Prerequisite: PBIO major; must have completed at least 30 hours; permission of instructor. This course is a planned hands-on work experience that will provide students with the opportunity to earn college credit while engaging in a valuable learning opportunity within the field of plant biology. Through an internship, students can explore plant biology career paths prior to graduation and apply the knowledge obtained from their PBIO coursework. (F, Sp, Su)
- PBIO 4693 Environmental Sampling Methods** **3 Credit Hours**
(Slashlisted with PBIO 5693; Crosslisted with METR and MBIO 4693) Prerequisite: diverse STEM background; permission of instructor; senior standing. The course gives students from diverse STEM backgrounds experience and knowledge of environmental sampling techniques, analysis of data generated, and interpretation of results in a scientific field outside their primary area of study. The multi-disciplinary structure helps students develop an understanding of different sampling techniques based on assumptions and perspectives on the environment at different spatial scales. No student may earn credit for both 4693 and 5693. (Sp)
- PBIO 4733 Environmental Remote Sensing** **3 Credit Hours**
(Slashlisted with PBIO 5733; Crosslisted with GIS 4733) Prerequisite: either a course or hands-on experience in remote sensing, GIS, statistical analysis, computer programming, or permission of the instructor and adviser. Course develops comprehensive knowledge and advanced skills of remote sensing, to apply to the study of the structure, composition, and functions of vegetation, landscapes, and the biosphere. Students will learn hyperspectral data acquisition and analysis; field survey methods; land cover classification from multiple sensors, time series data; and estimation of biophysical and biochemical parameters. Includes image processing software and algorithms. No student may earn credit for both 4733 and 5733. (Sp)
- PBIO 4783 Introduction to Python Programming for Data Analytics** **3 Credit Hours**
(Slashlisted with PBIO 5783; Crosslisted with MBIO 4783) Prerequisite: Senior standing. This course will introduce students, who have no prior programming experience, to Python programming. It will cover data analysis and visualization methods in Python. Real-world examples will be used to teach general concepts in data analytics and practical coding skills in Python. No student may earn credit for both 4783 and 5783. (F)
- PBIO 4843 Molecular Biology** **3 Credit Hours**
(Slashlisted with PBIO 5843; Crosslisted with MBIO and BIOL 4843) Prerequisite: MBIO 3812 and MBIO 3813, or Plant Biology 1114, or Biology 1114, or Biology 1124, or Biology 1134, and one course in organic chemistry. Introduction to the characteristics and biological functions of nucleic acids and proteins in living cells with emphasis on nucleic acid replication, transcription, translation and regulation; also emphasis on the molecular aspects of microbial genetics transformation, transduction and conjugation; and emphasis on molecular immunology and genetic engineering/recombinant DNA technology. No student may earn credit for both 4843 and 5843. (F, Sp)
- PBIO 4960 Directed Readings** **1-4 Credit Hours**
1 to 4 hours. Prerequisite: good standing in University; permission of instructor and dean; May be repeated; maximum credit four hours. Designed for upper-division students who need opportunity to study a specific problem in greater depth than formal course content permits. (Irreg.)
- PBIO 4970 Special Topics/Seminar** **1-3 Credit Hours**
1 to 3 hours. Prerequisite: Senior standing or permission of instructor; May be repeated; maximum credit nine hours. Special topics or seminar course for content not currently offered in regularly scheduled courses. May include library and/or laboratory research and field projects. (Irreg.)
- PBIO 4983 Senior Capstone: Plant Biol** **3 Credit Hours**
Prerequisite: Majors only, 12 hours of botany and senior standing. Interdisciplinary approach to synthesize ideas from the major areas of botany. Readings, research and discussions on the important issues in botany at the present and into the next century. A major written assignment required. [V].
- PBIO 4990 Independent Study** **1-3 Credit Hours**
1 to 3 hours. Prerequisite: three courses in general area to be studied, permission of instructor and department; May be repeated; maximum credit six hours. Contracted independent study for topic not currently offered in regularly scheduled courses. Independent study may include library and/or laboratory research and field projects. (F, Sp, Su)
- PBIO 5364 Transmis Electron Microscopy** **4 Credit Hours**
(Crosslisted with MBIO and ZOO 5364) Prerequisite: permission. Introduction to the theory of transmission electron microscopy and practical instruction in specimen preparation, ultramicrotomy, instrument operation, photography and quantitative methods. Laboratory (F)
- PBIO 5374 Scanning Electron Microscopy** **4 Credit Hours**
(Crosslisted with MBIO and ZOO 5374) Prerequisite: basic chemistry; basic physics; demonstrated need; graduate standing and permission of instructor. Principles of scanning electron microscopy combined with training in the operation of the SEM and ancillary equipment. Students will be certified in the operation of all equipment. Sample preparation on a variety of samples and darkroom procedures will be performed. Independent project with oral report and poster required. Laboratory.
- PBIO 5394 Advanced Light Microscopy** **4 Credit Hours**
(Slashlisted with PBIO 4394; Crosslisted with BIOL and MBIO 5394) Prerequisite: permission of instructor and graduate standing; Corequisite: Lab section. Focuses on theory and techniques in light microscopy covering principles including confocal laser scanning microscopy, multiple photon imaging, FLIM/FCS, FRET, fluorescence microscopy, phase contrast, DIC, 3D rendering, and other advanced optical technologies. Also includes a lab section where students will learn to use advanced epifluorescence and confocal microscopes. No student may earn credit for both 4394 and 5394. (F)

- PBIO 5453 Advanced Ecology/Evolut Biol 3 Credit Hours**
(Crosslisted with BIOL 5453) Prerequisite: Graduate standing, general ecology. Required for students in the ecology and evolutionary biology doctoral program. An introduction to current research opportunities and research programs in ecology and evolutionary biology at the University of Oklahoma. Specific topics and lecturers will vary from week to week to give students a broad overview of ongoing research projects. (F)
- PBIO 5471 Seminar in Ecology & Evolutionary Biology 1 Credit Hour**
(Crosslisted with MBIO and BIOL 5471) Prerequisite: graduate standing; May be repeated, maximum credit 2 hours. Two semesters of enrollment are required for students in the ecology and evolutionary biology doctoral program. An intensive, student-based seminar in which students present both proposals and ongoing progress reports on doctoral level research projects in ecology and evolutionary biology. (F, Sp)
- PBIO 5620 Investigations in Botany 1-6 Credit Hours**
1 to 6 hours. Prerequisite: 15 hours of BOT/PBIO and permission of instructor; May be repeated, maximum of nine hours for a masters student and twelve hours for Ph.D. student. Only six hours allowed with one professor, unless approved by Department Chair by petition. Fields: Ecology, morphology, physiology, systematics, mycology, anatomy, electron microscopy, plant molecular biology. (F, Sp, Su)
- PBIO 5693 Environmental Sampling Methods 3 Credit Hours**
(Slashlisted with PBIO 4693; Crosslisted with MBIO and METR 5693) Prerequisite: Graduate standing and permission of instructor. The course gives students from diverse STEM backgrounds experience and knowledge of environmental sampling techniques, analysis of data generated, and interpretation of results in a scientific field outside their primary area of study. The multi-disciplinary structure helps students develop an understanding of different sampling techniques based on assumptions and perspectives on the environment at different spatial scales. No student may earn credit for both 4693 and 5693. (Sp)
- PBIO 5733 Environmental Remote Sensing 3 Credit Hours**
(Slashlisted with PBIO 4733; Crosslisted with GIS 5733) Prerequisite: Graduate standing, and either a course or hands-on experience in remote sensing, GIS, statistical analysis, computer programming, or permission of the instructor and adviser. Course develops comprehensive knowledge and advanced skills of remote sensing, to apply to the study of the structure, composition, and functions of vegetation, landscapes, and the biosphere. Students will learn hyperspectral data acquisition and analysis; field survey methods; land cover classification from multiple sensors, time series data; and estimation of biophysical and biochemical parameters. Includes image processing software and algorithms. No student may earn credit for both 4733 and 5733. (Sp)
- PBIO 5810 Special Topics 1-3 Credit Hours**
1 to 3 hours. (Slashlisted with PBIO 4810) Prerequisite: two courses in plant biology, graduate standing, and permission of instructor; May be repeated with change of content, maximum credit three hours per semester, nine hours total. 1 to 3 hours. Topics will include newly developing areas of the discipline. Taught at the graduate level based on previous course background. No student may earn credit for both 4810 and 5810 for the same content. No student may earn credit for both 4810 and 5810. (Irreg.)
- PBIO 5821 Graduate Professional Development Seminar 1 Credit Hour**
(Crosslisted with MBIO 5821) Prerequisite: Graduate standing and permission of instructor. This course will cover various topics and involve activities that are targeted at helping graduate students succeed in their first year of study, while also providing an opportunity to build a sense of community with other incoming students. (F)
- PBIO 5953 BioWriting 3 Credit Hours**
(Slashlisted with PBIO 4953; Crosslisted with BIOL and MBIO 5953) Prerequisite: permission of instructor. This course provides students engaged in research with the information and skills needed to effectively communicate as professional biologists. Students will learn to report the results of their own research in the format of a journal article, conference-style presentation, and poster. Graduate students have additional assignments beyond those completed by undergraduates. No student may earn credit for both 4953 and 5953. (Irreg.)
- PBIO 5960 Directed Readings 1-3 Credit Hours**
1 to 3 hours. Prerequisite: graduate standing and permission of department; May be repeated, maximum credit twelve hours. Directed readings and/or literature reviews under the direction of a faculty member. (F, Sp, Su)
- PBIO 5970 Special Topics/Seminar 1-3 Credit Hours**
1 to 3 hours. Prerequisite: Graduate standing or permission of instructor; May be repeated, maximum credit nine hours. Special topics or seminar course for content not currently offered in regularly scheduled courses. May include library and/or laboratory research and field projects. (Irreg.)
- PBIO 5971 Seminar in Botany 1 Credit Hour**
(Crosslisted with MBIO 5971) Prerequisite: graduate standing, majors only, and permission of instructor. Required of all graduate students in botany. May be repeated; maximum credit two hours for the master's degree, three hours for the doctor's degree. Selected topics in botany. Each student is called upon for discussion or formal presentations. No laboratory. (F, Sp)
- PBIO 5980 Research for Master's Thesis 2-9 Credit Hours**
2 to 9 hours. Prerequisite: Graduate standing. Variable enrollment, two to nine hours; maximum credit applicable toward degree, six hours. Preparation of an original research paper in one of the fields of botany. (F, Sp, Su)
- PBIO 5990 Special Studies in Botany 1-3 Credit Hours**
1 to 3 hours. Prerequisite: Graduate standing, 15 hours of BOT/PBIO and permission of instructor; May be repeated, maximum credit 12 hours, with a limit of six hours with one professor unless approved by Department Chair by petition. The student selects an area in which the student desires to read intensively, then selects a staff member who is an authority in that field and together they plan a program for investigation of the literature. (F, Sp, Su)
- PBIO 6960 Directed Readings 1-3 Credit Hours**
1 to 3 hours. Prerequisite: graduate standing or permission of instructor; May be repeated, maximum credit six hours. Directed readings and/or literature review under the direction of a faculty member. (Irreg.)
- PBIO 6970 Special Topics/Seminar 1-3 Credit Hours**
1 to 3 hours. Prerequisite: graduate standing or permission of instructor; May be repeated, maximum credit 12 hours. Special topics or seminar course for content not currently offered in regularly scheduled courses. May include library and/or research and field projects. (Irreg.)
- PBIO 6980 Research for Doctoral Dissertation 2-16 Credit Hours**
2 to 16 hours. Prerequisite: Graduate standing and permission of instructor; may be repeated. Preparation of a research paper consisting of a notable contribution to knowledge in one of the fields of botany. (F, Sp, Su)

PBIO 6990 Independent Study 1-3 Credit Hours

1 to 3 hours. Prerequisite: Graduate standing and permission of instructor; May be repeated, maximum credit nine hours. Contracted independent study for a topic not currently offered in regularly scheduled courses. Independent study may include library and/or laboratory research and field projects. (Irreg.)