

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-LAB].
- 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-LAB].
- 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 eucaryotic 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 3283 Introduction to Genomics 3 Credit Hours**
 (Crosslisted with MBIO 3283) Prerequisite: PBIO 1114, or BIOL 1114, or BIOL 1134, or one course in Organic Chemistry (CHEM 3053 or CHEM 3153 or CHEM 3064 or CHEM 3164). Provides the most updated knowledge on prokaryotic and eukaryotic genomics including the biochemical, molecular and cellular structure of the genome as well as the current molecular and bioinformatics technologies existing when analyzing complex genomes and gene function. Through lectures and presentation of scientific literature, specific examples will be presented to highlight each aspect of the course. (F)
- PBIO 3333 Genetics 3 Credit Hours**
 (Crosslisted with ZOO 3333) Prerequisite: eight hours of zoology and/or PBIO and/or microbiology, or five hours of zoology or PBIO or microbiology 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 3342 Genetics Laboratory 2 Credit Hours**
 (Crosslisted with ZOO 3342) Prerequisite: 3333 or concurrent enrollment or equivalent. The demonstrations, crosses and experiments are designed to illustrate various genetic phenomena, including Mendelian laws, recombination, mutation, natural and artificial selection and interaction of genotype with environment. The primary organism studied is *Drosophila*, with some use of corn, *Neurospora* and others. Laboratory (F)
- 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**
 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 3452 Methods in Plant Ecology 2 Credit Hours**
 Prerequisite: 3534; corequisite 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 Biology 1134 or permission of instructor. 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 3534 Flowering Plants 4 Credit Hours**
 Prerequisite: 1114 or six hours of biology or permission of instructor. Introduction to the classification of vascular plants with emphasis on the origin, evolutionary relationships and reproductive biology of the flowering plants. Laboratory activities stress identification skills, terminology, field techniques and family recognition for the flora of Oklahoma. Field trips. Laboratory (Sp)
- 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 3932 Instrumental Methods in Biology 2 Credit Hours**
 (Crosslisted with MBIO 3932) Prerequisite: one of the following: PBIO 4115 or Microbiology 2815 or Microbiology 3813 or Biology 2124 or one course in biochemistry; and Physics 2414. Principles of analytical measurements; common categories of instruments; advantages and disadvantages of each method; examples are chosen from medical technology, environmental technology, biochemistry, physiology, etc. (F)

- PBIO 3953 Global Change Biology** **3 Credit Hours**
Prerequisite: PBIO 1114. Students will read, discuss and synthesize key literature in global change biology using a combination of lectures, in-class activities, and in-class discussions of primary literature. Explores the impacts of two main global change factors, climatic change and invasive species, influencing biodiversity, ecosystem structure and function with a final focus on the potential of adaptation and conservation approaches and utilization of models to help predict future impacts. (F, even-numbered years)
- 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. (By request)
- 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. (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 G4224 Plant Development** **4 Credit Hours**
Prerequisite: PBIO 1114; PBIO 3333 and PBIO 4843 (recommended). Focuses on genetic networks that control various developmental processes during plant development. In the labs, we will examine and analyze the effects of mutations in developmental genes on plant development. By the end of the semester, students should understand how the plant life cycle is controlled at a molecular genetic level. Laboratory. (Sp)
- PBIO 4263 Cell Biology Laboratory** **3 Credit Hours**
(Crosslisted with MBIO 4263) Prerequisites: MBIO 3812 and 3813, or two courses in Plant Biology, and completion of or concurrent enrollment in MBIO/PBIO/BIOL 3113 Cell Biology. This lab course will give students experience with modern techniques used in the study of cells. The techniques covered will allow exploration of cell biology at the level of tissues, single cells, subcellular components, and molecules. (F)
- PBIO 4264 Morphology of Vascular Plants** **4 Credit Hours**
(Slashlisted with PBIO 5264). Prerequisite: permission of instructor. Structural organization and phylogenetic relationships of vascular land plants are explored using living and extinct plants. Emphasis is given to understanding the origins, unique and common features of plant life histories, organography and morphogenesis. No student may earn credit for both 4264 and 5264. (Irreg.)
- 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. Intended for students who possess a working knowledge of molecular biology, this course will focus on developing familiarity with methods used in biotechnology to address pressing 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 4394 Advanced Light Microscopy** **4 Credit Hours**
(Crosslisted with BIOL 4394 and MBIO 4394; Slashlisted with PBIO 5394) Prerequisite: permission of instructor and junior 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 4483 Physiological Plant Ecology** **3 Credit Hours**
(Slashlisted with PBIO 5483) Prerequisite: PBIO 3453 or PBIO 4115 or permission of instructor. Study of energy budgets, plant water relations, carbon uptake and release, nutrient uptake and availability, and other factors as they affect plant growth, competition and ecosystem-level factors. In-depth analysis of current literature. No student may earn credit for both 4483 and 5483. (F, even-numbered years)
- PBIO 4553 Plant Geography** **3 Credit Hours**
(Slashlisted with 5553) Prerequisite: 3453, 3534, or permission of instructor. Analysis of the evolutionary, ecological, genetic and historical factors that affect present-day distributional patterns of plants on continents and islands. Particular emphasis is directed to range disjunctions and endemism as well as the effects of continental drift, geoclimatic changes, dispersal, polyploidy and phylogeny on the flora of North America. No student may earn credit for both 4553 and 5553. (F odd-numbered years)
- PBIO 4623 Ecosystem Ecology** **3 Credit Hours**
(Slashlisted with 5623) Prerequisite: 3453 or equivalent. Studies interactions between organisms and their environment with an earth-system context. Students will learn general concepts of ecosystems; examine major factors that control ecosystems properties; explore ecosystem functions and structure and their spatial and temporal variation; and evaluate implications of ecosystem processes for functioning of the global system and sustainable use by human beings. No student may earn credit for both 4623 and 5623. (F)
- PBIO 4723 General Mycology** **3 Credit Hours**
(Slashlisted with PBIO 5723) Prerequisite: PBIO 1114, or BIOL 1134, or MBIO 3812 and MBIO 3813. A survey of the fungi, including diversity, biology, and significance in ecology and human affairs. No student may earn credit for both 4723 and 5723. (Irreg.)

- 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 4810 Special Topics 1-3 Credit Hours**
(Slashlisted with PBIO 5810) 1 to 3 hours. Prerequisite: two courses in botany and permission. May be repeated with change of content; maximum credit three hours per semester, nine hours total. Topics will include newly developing areas of the discipline. Taught at an upper-division level based on previous course background. No student may earn credit for both 4810 and 5810 for the same course content. (Irreg.)
- PBIO 4843 Molecular Biology 3 Credit Hours**
(Crosslisted with MBI0 and BIOL 4843; Slashlisted with PBIO 5843) Prerequisite: MBI0 3812 and MBI0 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 4873 Microbial Phys & Molec Bio Lab 3 Credit Hours**
(Crosslisted with MBI0 4873) Prerequisite: junior standing or permission of instructor. Current techniques to explore molecular aspects of gene expression and regulation. Experiments include: plasmid and phage propagation, nucleic acid purification, DNA and protein manipulation, and gene analysis. (F, Sp) [II-LAB].
- PBIO 4953 BioWriting 3 Credit Hours**
(Slashlisted with PBIO 5953; Crosslisted with BIOL/MBIO 4953) 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. No student may earn credit for both 4953 and 5953. (Irreg.)
- 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: 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 5264 Morphology of Vascular Plants 4 Credit Hours**
(Slashlisted with PBIO 4264). Prerequisite: graduate standing, permission of instructor. Structural organization and phylogenetic relationships of vascular land plants are explored using living and extinct plants. Emphasis is given to understanding the origins, unique and common features of plant life histories, organography and morphogenesis. No student may earn credit for both 4264 and 5264. (Irreg.)
- PBIO 5364 Transmis Electron Microscopy 4 Credit Hours**
(Crosslisted with MBI0 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 MBI0 and ZOO 5374) Prerequisite: basic chemistry; basic physics; demonstrated need; 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**
(Crosslisted with BIOL 5394 and MBI0 5394; Slashlisted with PBIO 4394) 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 MBI0 and ZOO 5453) Prerequisite: 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-Ecology/Evolut Biology 1 Credit Hour**
(Crosslisted with MBI0 and ZOO 5471) Prerequisite: graduate standing. 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 5483 Physiological Plant Ecology 3 Credit Hours**
(Slashlisted with PBIO 4483) Prerequisite: graduate standing and PBIO 3453 or PBIO 4115 or permission of instructor. Study of energy budgets, plant water relations, carbon uptake and release, nutrient uptake and availability, and other factors as they affect plant growth, competition and other ecosystem-level factors. In-depth analysis of current literature. No student may earn credit for both 4483 and 5483. (F, even-numbered years)
- PBIO 5553 Plant Geography 3 Credit Hours**
(Slashlisted with 4553) Prerequisite: 3453 or equivalent, 3534. Analysis of the evolutionary, ecological, genetic and historical factors that affect present-day distributional patterns of plants on continents and islands. Particular emphasis is directed to range disjunctions and endemism as well as the effects of continental drift, geoclimatic changes, dispersal, polyploidy and phylogeny on the flora of North America. No student may earn credit for both 4553 and 5553.
- PBIO 5620 Investigations in Botany 1-6 Credit Hours**
1 to 6 hours. Prerequisite: 15 hours of BOT/PBIO, 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 5623 Ecosystem Ecology 3 Credit Hours**
(Slashlisted with 4623) Ecosystem Ecology (Slashlisted With 4623). Prerequisite: 3453 Or Equivalent. Studies Interactions Between Organisms And Their Environment Within An Earth-System Context. Students Will Learn General Concepts Of Ecosystems; Examine Major Factors That Control Ecosystems Properties; Explore Ecosystem Functions And Structure And Their Spatial And Temporal Variation; And Evaluate Implications Of Ecosystem Processes For Functioning Of The Global System And Sustainable Use By Human Beings. No Student May Earn Credit For Both 4623 And 5623. (F)
- PBIO 5723 General Mycology 3 Credit Hours**
(Slashlisted with PBIO 4723) Prerequisite: PBIO 1114, or BIOL 1134, or MBIO 3812, and MBIO 3813, and graduate standing. A survey of the fungi, including diversity, biology, and significance in ecology and human affairs. No student may earn credit for both 4723 and 5723. (Irreg.)
- PBIO 5733 Environmental Remote Sensing 3 Credit Hours**
(Slashlisted with PBIO 4733; Crosslisted with GIS 5733) 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 5810 Special Topics 1-3 Credit Hours**
(Slashlisted with PBIO 4810) 1 to 3 hours. 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. 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. (Irreg.)
- PBIO 5843 Molecular Biology 3 Credit Hours**
(Crosslisted with MBIO and BIOL 5843; Slashlisted with PBIO 4843) Prerequisite: graduate standing or permission of instructor. 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 5883 Advanced Molecular Biology 3 Credit Hours**
(Crosslisted with MBIO 5883) Prerequisite: graduate standing and MBIO/ Plant Biology/Biology 4843 or 5843; or Chemistry 3653; or permission of instructor. This course will expose students to the study of molecular biology in real-life research laboratories, focusing on the thought and practice behind molecular biology. Scientific literature will be used as a source of information to highlight the practical concerns for students working in molecular biology laboratories. (Sp)
- PBIO 5953 BioWriting 3 Credit Hours**
(Slashlisted with PBIO 4953; Crosslisted with BIOL/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**
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**
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: 15 hours of BOT/PBIO, 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 6003 Ecological Modeling 3 Credit Hours

(Crosslisted with MBIO and ZOO 6003) Prerequisite: one computer course, one course in ecology, or permission of instructor. Trains students to use modeling tools in their research and to gain greater ability to understand, appreciate, and criticize modeling work. Students will learn general procedure and principles with case studies of successful models in ecology and participate in course projects to gain hands-on experience in model development. (Irreg.)

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 Doctoral Dissertation 2-16 Credit Hours

2 to 16 hours. 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.)