821 Crop Evolution
Spring of odd years. 1 credit. Interdepartmental with Horticulture; Crop and Soil Sciences; Forestry; Plant Pathology. Administered by Department of Horticulture. RB: Introductory Genetics and Plant Biology
Cultural and biological aspects of the evolution of domestic plants.

822 Historical Geography of Crop Plants
Spring of odd years. 1 credit. Interdepartmental with Horticulture; Crop and Soil Sciences; Forestry; Plant Pathology. Administered by Department of Horticulture. RB: Introductory Genetics and Plant Biology
Development and spread of the major crop species.

824 Principles and Methods of Plant Systematics
Spring. 3(3-0) SA: BOT 824
Classification methods; quantification of evolutionary relationships; phenetic, phyletic, molecular, and cladistic approaches.

826 Tropical Biology: An Ecological Approach
Spring, Summer. 8 credits. Given in Costa Rica. Interdepartmental with Zoology. R: Approval of department; application required. SA: BOT 826
Principles of tropical ecology at the population, community, and ecosystem levels. Given at various sites in Costa Rica by the Organization for Tropical Studies.

828 Conservation and Genetics
Fall of even years. 3(2-2) Interdepartmental with Fisheries and Wildlife; Zoology. Administered by Department of Fisheries and Wildlife. RB: (ZOL 341 or CSS 350 or ANS 314)
Population and evolutionary genetic principles applied to ecology, conservation, and management of fish and wildlife at the individual, population, and species level.

835 Biogeography
Spring of odd years. 3(3-0) Interdepartmental with Fisheries and Wildlife; Geography; Zoology. Administered by Department of Fisheries and Wildlife. RB: Courses in evolution and ecology at undergraduate level.
Geographical distributions of plants and animals; biogeographic realms. Ecological and evolutionary mechanisms determining distributional patterns. Application of biogeography to conservation problems.

842 Application of Ecological Principles
Spring. 2 credits. A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Zoology. SA: BOT 842
Workshops and discussions with experts from industry, regulatory agencies, conservation groups, and academe on application of basic ecology and evolutionary biology to real-world problems.

847 Advanced Mycology
Spring of even years. 4(2-4) Interdepartmental with Plant Pathology. Administered by Department of Plant Pathology. RB: (BOT 402) SA: BOT 847
Systematics, identification, physiology, genetics, and molecular biology of plant pathogenic fungi.

849 Evolutionary Biology
Spring. 3(3-0) Interdepartmental with Zoology. RB: (ZOL 341 and STT 422 or concurrently) SA: BOT 849
Major conceptual, theoretical and empirical questions in evolutionary biology. Readings and lectures are synthesized in student discussions and papers.

851 Quantitative Methods in Ecology and Evolution
Fall. 3(3-0) Interdepartmental with Zoology. Administered by Department of Zoology. RB: (STT 465)
Interpretation and analysis of ecological and evolutionary biology data. Statistical computer software.

855 Molecular Evolution: Principles and Techniques
Fall of odd years. 3(3-0) Interdepartmental with Zoology; Microbiology and Molecular Genetics. Administered by Department of Zoology. RB: (ZOL 341 or ZOL 445)
Current techniques used to characterize and compare genes and genomes. Genetic variation, assays of variation. Data analysis and computer use to conduct a phylogenetic analysis to compare organisms and infer relationships.

856 Plant Molecular Biology
Spring. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology. RB: (ZOL 341) SA: BOT 856
Recent advances in genetics and molecular biology of higher plants.

863 Environmental Plant Physiology
Spring of odd years. 3(3-0) Interdepartmental with Horticulture. RB: (PLB 301 or PLB 414 or PLB 415) SA: BOT 863
Interaction of plant and environment. Photobiology, thermophysiology, and plant-water relations.

864 Plant Biochemistry
Spring. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology. Administered by Department of Biochemistry and Molecular Biology. RB: BMB 401 or BMB 462. SA: BCH 864
Biochemistry unique to photosynthetic organisms. Photosynthetic and respiratory electron transport, nitrogen fixation, carbon dioxide fixation, lipid metabolism, carbon partitioning, cell walls, biosynthesis of plant hormones.

865 Plant Growth and Development
Fall. 3(3-0) RB: (PLB 415) SA: BOT 865
Physiology and biochemistry of growth and development as regulated by internal and external factors. Biosynthesis and action of plant hormones. Environmental factors: light and temperature.

891 Current Topics in Ecology and Evolution
Summer. 1 credit. Given only at W.K. Kellogg Biological Station. A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Zoology; Crop and Soil Sciences. Administered by Department of Zoology.
Presentation and critical evaluation of theoretical and empirical developments by visiting scientists.

896 Population and Community Ecology
Fall. 4(4-0) Interdepartmental with Zoology. Administered by Department of Zoology.
Population dynamics of animals and plants utilizing life tables and projection matrices. Species interaction. Life history theory. Structure and dynamics of communities. Succession.

897 Ecosystem Ecology
Spring. 4(4-0) Interdepartmental with Zoology; Fisheries and Wildlife. Administered by Department of Zoology.
Structure and function of natural ecosystems. Succession, food web analysis, energy flow, nutrient cycling, and effects of human activities on ecosystems. Global environmental change. Ecosystem management and restoration.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to graduate students. SA: BOT 899
Research in anatomy, bryology cell biology, ecology, genetics, molecular biology, morphology, mycology, paleobotany, pathology, physiology and systematics.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students. SA: BOT 999
Research in anatomy, bryology cell biology, ecology, genetics, molecular biology, morphology, mycology, paleobotany, pathology, physiology and systematics.

PLANT PATHOLOGY PLP

Department of Plant Pathology
College of Agriculture and Natural Resources

101 Current Issues and Frontiers in Plant Pathology
Fall. 1(1-0)
Basic principles of plant disease and plant pathogens. Current topics and future opportunities in the discipline of plant pathology.

205 Pests, Society and Environment
Fall, Spring. 3(3-0) Interdepartmental with Entomology. Administered by Department of Entomology.
Nature of pests and their impact on society. Principles of integrated pest management in relation to environmental quality and sustainable development.

362 Management of Turfgrass Pests
Fall. 4(3-2) Interdepartmental with Crop and Soil Sciences; Entomology. Administered by Department of Crop and Soil Sciences. P:M: (CSS 232)
Chemical, biological, and cultural methods of managing weeds, diseases, and insect pests of turfgrass. Environmental considerations in pest management.

402 Biology of Fungi
Fall. 3(2-3) Interdepartmental with Plant Biology. Administered by Department of Plant Biology. P:M: (BS 110 or BS 111 or PLB 105 or LBS 145 or LBS 148H or LBS 149H) SA: BOT 402
Major groups of fungi: characteristics, habitats and diversity. Significance of fungi in nature and their economic importance.

405 Plant Pathology
Spring. 3(2-3) P:M: (BS 110 and BS 111) or (PLB 105 and PLB 106) or (LBS 144 and LBS 145) or (LBS 148H and LBS 149H) and completion of Tier I writing requirement. SA: BOT 405 Not open to students with credit in BOT 407.
Plant diseases and the organisms that cause them. Principles of disease management including application of chemicals, plant breeding, biological control, and genetic engineering.

407 Diseases and Insects of Forest and Shade Trees
Spring. 4(3-3) Interdepartmental with Entomology; Plant Biology. P:M: (PLB 105 or BS 110 or LBS 144 or LBS 148H) and (PLB 218 or FOR 204 or HRT 211) and completion of Tier I writing requirement. SA: BOT 407
Diseases, insects, and environmental problems affecting trees in forests, parks, suburbs, and nurseries. Methods of control.

490 Independent Study
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
Independent study of plant pathology on a laboratory, field or library research program of special interest to the student.

491 Selected Topics in Plant Pathology
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (PLP 405 or PLP 407)
Selected topics in plant pathology of current interest and importance.

493 Professional Internship in Plant Pathology
Fall, Spring, Summer. 3 credits. R: Open only to juniors or seniors in the Plant Pathology major. Approval of department, application required. A student may earn a maximum of 6 credits for any or all of these courses: ABM 493, AEE 493, ANR 493, ANS 493, CSS 493, EEP 493, FIM 493, FW 493, HRT 493, PKG 493, PLP 493, PRR 493, and RD 493.
Supervised professional experiences in agencies and businesses related to plant pathology.

810 Current Concepts in Plant Pathology
Spring. 3(3-0) RB: (PLP 405 or PLB 414 or PLB 415) SA: BOT 810
Recent findings in mycology, plant virology, bacteriology, nematology, disease physiology and epidemiology.

812 Epidemiology of Plant Diseases
Spring of even years. 3(3-0) RB: (PLP 810) SA: BOT 812
Populations of plant pathogens within populations of plant hosts as affected by the environment and humans.

820 Plant Reproductive Biology and Polyploidy
Spring. 1 credit. Interdepartmental with Horticulture; Crop and Soil Sciences; Forestry; Plant Biology. Administered by Department of Horticulture. RB: Introductory Genetics and Plant Biology
Genetic processes underlying variations in plant reproductive biology and polyploidy and the utilization of these characteristics in plant breeding.

821 Crop Evolution
Spring of odd years. 1 credit. Interdepartmental with Horticulture; Crop and Soil Sciences; Forestry; Plant Biology. Administered by Department of Horticulture. RB: Introductory Genetics and Plant Biology
Cultural and biological aspects of the evolution of domestic plants.

822 Historical Geography of Crop Plants
Spring of odd years. 1 credit. Interdepartmental with Horticulture; Crop and Soil Sciences; Forestry; Plant Biology. Administered by Department of Horticulture. RB: Introductory Genetics and Plant Biology
Development and spread of the major crop species.

847 Advanced Mycology
Spring of even years. 4(2-4) Interdepartmental with Plant Biology. RB: (BOT 402) SA: BOT 847
Systematics, identification, physiology, genetics, and molecular biology of plant pathogenic fungi.

870 Nematode Management in Crop Systems
Summer of even years. 3(2-3) Interdepartmental with Entomology. Administered by Department of Entomology. RB: (PLP 405) SA: BOT 870
Biology, host parasite relationships and management by farming and cropping systems of selected nematode diseases of economic plants.

880 Plant Virology
Fall of odd years. 4(2-4) RB: (BMB 462 and BOT 810) SA: BOT 880
Biology and molecular aspects of viruses causing plant disease.

881 Molecular and Biochemical Plant Pathology
Spring of odd years. 3(2-2) RB: (BMB 462 and ZOL 341 and PLP 810) and (BOT 414 or BOT 415) SA: BOT 881
Biochemical and molecular bases of host-pathogen interactions. Mechanisms of pathogenicity and the nature of disease resistance.

884 Prokaryotic Diseases of Plants
Fall of even years. 4(2-4) RB: (BOT 810) SA: BOT 884
Prokaryotic genera associated with plant diseases. Identification, physiology, and genetics. Laboratory techniques.

885 Plant Diseases in the Field
Summer of odd years. 2(1-3) RB: (PLP 810) R: Open only to graduate students. SA: BOT 885
Diagnosis of plant diseases and disorders in a field setting. Field trips and independent study required.

894 Seminar in Plant Pathology
Fall, Spring. 1(1-0) A student may earn a maximum of 6 credits in all enrollments for this course.
Review, organization, analysis and oral presentation of research.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
Master's thesis research.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.
Doctoral dissertation research.

POLITICAL SCIENCE PLS

Department of Political Science
College of Social Science

100 Introduction to American National Government
Fall, Spring, Summer. 3(3-0)
The policymaking process in national government, with emphasis on political participation, the presidency, Congress, Supreme Court, bureaucracy, and civil rights and civil liberties.

140 Government and Politics of the World
Fall, Spring, Summer. 3(3-0)
Comparative analysis of political systems in first, second, and third-world countries. Alternative methods for comparative cross-cultural analyses of political systems.

160 Introduction to International Relations
Fall, Spring, Summer. 3(3-0) Not open to students with credit in MC 220 or MC 221.
Dynamics of conflict and cooperation. Processes of foreign policy decision making. Major international economic issues. Basic future trends. Primary analytical approaches for studying world politics.

170 Introduction to Political Philosophy
Fall, Spring, Summer. 3(3-0)
Basic questions of political philosophy as considered from ancient to modern times. Primary focus on the origins, defense, and radical critiques of modern liberal democracy.

200 Introduction to Political Science
Fall, Spring, Summer. 4(4-0)
The science of politics. Theory construction, model building, empirical testing, and inductive inference. Examples from American, international and comparative politics.

201 Introduction to Methods of Political Analysis
Fall, Spring, Summer. 4(4-0) P:M: (PLS 200 or MC 201)
Philosophy of social science. Principles of research design, measurement, hypothesis testing, measures of association, cross tabulations, and regression analysis.

301 American State Government
Spring. 3(3-0)
Structure and processes of American state government. Interstate differences. Constitutions, elections, political parties, interest groups, and intergovernmental relations. Policy focus on education, welfare, and criminal justice.