

Department of Entomology and Plant Pathology

The Department of Entomology and Plant Pathology enjoys a rich tradition in teaching, research and outreach activities as part of a land grant institution in Alabama. From the hiring of its first entomologist in 1896 and its first plant pathologist in 1903, the entomology and plant pathology program at AU has grown to its present faculty of entomologists and plant pathologists with teaching, research and extension responsibilities.

As a part of the College of Agriculture, the entomology and plant pathology department offers a broad range of both basic and applied courses at the undergraduate and graduate levels, providing a sound background for students considering careers in entomology, plant pathology, and related pest management areas. The curriculum is complemented by a diversity of courses in agricultural and biological sciences offered through departments in the university. The department offers undergraduate minors in entomology and plant pathology. It also offers thesis and non-thesis master's degrees and doctoral programs in these disciplinary areas.

Majors

- Applied Biotechnology (http://bulletin.auburn.edu/undergraduate/collegeofagriculture/entomologyandplantpathology/appliedbiotechnology_major/)

Minors

- Entomology (http://bulletin.auburn.edu/undergraduate/collegeofagriculture/entomologyandplantpathology/entomolgy_minor/)
- Plant Pathology (http://bulletin.auburn.edu/undergraduate/collegeofagriculture/entomologyandplantpathology/plantpathology_minor/)

Applied Biotechnology Courses

APBT 1000 INTRODUCTION TO APPLIED BIOTECHNOLOGY (1) LEC. 1. Introduction to the field of biotechnology including key concepts from biology, chemistry, and physics, and career opportunities.

APBT 2950 PROFESSIONAL DEVELOPMENT (1) LEC. 1. Development of professional skills required for modern careers in entomology, plant pathology and applied biotechnology.

APBT 2980 INTRODUCTION TO UNDERGRADUATE RESEARCH (1-4) IND/RES. Departmental approval. Directed research in the area of specialty within the department. Course may be repeated for a maximum of 4 credit hours.

APBT 3100 METHODS OF SYNTHETIC BIOLOGY (4) LEC. 2. LAB. 5. Pr. (BIOL 1030 or BIOL 1037) and APBT 1000. This course provides an overview of the basic cellular processes harnessed by synthetic biology and biotechnology. It also provides an introduction to recombinant DNA and its applications. It combines lectures with labs to provide hands-on experience with molecular techniques, DNA cloning, heterologous protein expression, and methodologies used to engineer organisms.

APBT 4100 APPLIED BIOTECHNOLOGY (4) LEC. 2. LAB. 4. Pr. (BIOL 1030 or BIOL 1037) and (BIOL 3000 or BIOL 3003 or AGRI 3000) and APBT 3100. or instructor's approval. Principle and up-to-date advances of genetic modification of organisms; its practices and influences in a broad range of basic and applied sciences which have revolutionized "mean" of sustainable agriculture.

APBT 4920 INTERNSHIP (3) LEC. 3. SU. Pr. APBT 1000. Practical professional experience under the supervision of internship faculty and/or representatives of state, federal or private agency.

APBT 4980 UNDERGRADUATE RESEARCH (1-4) LAB. 2-8. Departmental approval. Directed research in the area of specialty within the department. Course may be repeated for a maximum of 4 credit hours.

APBT 5660 FIGURE FUNDAMENTALS : SCIENTIFIC ILLUSTRATION (3) LEC/STU. 1. Scientific illustration and data visualization implemented through the Adobe creative cloud package. May count either APBT 5660, ENTM 5660, or ENTM 6660.

APBT 5800 OMICS IN AGRICULTURE (3) LEC. 2. LAB. 2. Pr. BIOL 1030 or BIOL 3000 or AGRI 3000. This course will introduce students to the recent advances in high-throughput technologies such as genomics, transcriptomics, metagenomics, metabolomics, phenomics, modeling, and digital agriculture and how these technologies can be applied to tackling new and old problems in agriculture and human health. Students will be able to gain hands-on experience in analyzing and interpreting datasets obtained using these technologies.

APBT 5820 PRINCIPLES AND TOOLS FOR REPRODUCIBLE SCIENCE IN AGRICULTURE (2) LEC. 2. Pr. STAT 2510. Reproducibility is fundamental to science. This course will cover basic concepts in scientific reproducibility, accessibility, and organization as it relates to handling large datasets and publishing data workflows.

Entomology Courses

ENTM 2000 PESTS, PATHOGENS, PARASITES, AND PEOPLE (3) LEC. 3. Past and present problems of pests and disease involving humans and the food chain.

ENTM 2040 INSECTS: AN INTRODUCTION TO ENTOMOLOGY (3) LEC. 3. Life processes, importance, and occurrence of insects.

ENTM 2980 INTRODUCTION TO UNDERGRADUATE RESEARCH (1-4) IND/RES. Departmental approval. Directed research in the area of specialty within the department. Course may be repeated for a maximum of 4 credit hours.

ENTM 3040 GENERAL ENTOMOLOGY (4) LEC. 3. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Introduction to the biology and diversity of insects. An insect collection is required.

ENTM 4020 ECONOMIC ENTOMOLOGY (4) LEC. 3. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Consideration of the biological aspects, life histories and control of insects.

ENTM 4920 ENTOMOLOGY INTERNSHIP (5) INT. 5. SU. Practical professional experience under the supervision of internship faculty and/or representatives of state, federal or private agency.

ENTM 4960 SPECIAL PROBLEMS IN ENTOMOLOGY (1-3) IND. Departmental approval. Credit to be arranged. Specialized project or research on a specific topic in entomology to be conducted under faculty supervision. Course may be repeated for a maximum of 3 credit hours.

ENTM 4980 UNDERGRADUATE RESEARCH (1-4) LAB. 2-8. Departmental approval. Directed research in the area of specialty within the department. Course may be repeated for a maximum of 4 credit hours.

ENTM 5120 MEDICAL-VETERINARY ENTOMOLOGY (4) LEC. 3. LAB. 1. Pr. (BIOL 1030 or BIOL 1037) and (ENTM 3040 or ENTM 4020). Survey of insects, ticks, and mites of medical or veterinary importance, emphasizing role as vectors of disease agents and the biology of pathogen-transmission cycles. Labs focus on methods of vector sampling and surveillance, identification, and case studies of special topics. May count either ENTM 5120 or ENTM 6120.

ENTM 5220 INSECT ECOLOGY (4) LEC. 3. LAB. 3. Pr. BIOL 3060. Ecological interactions of insects and their environment, with emphasis on is herbivory, predation, parasitism and mutualism, as well as population and community dynamics.

ENTM 5300 INSECT DIVERSITY (4) LEC. 3. LAB. 1. Pr. ENTM 3040 or ENTM 4020. Survey of the biodiversity of insects, stressing taxon diagnostics.

ENTM 5330 INTEGRATED PEST MANAGEMENT (3) LEC. 3. Aspects of pest management as a broad-based approach that integrates practices for economic control of pests. May count either ENTM/HORT/PLPA 5330/6330.

ENTM 5360 LANDSCAPE ENTOMOLOGY (4) LEC. 3. LAB. 3. Pr. (BIOL 1020 or BIOL 1027) or (BIOL 1030 or BIOL 1037). Identification and management of arthropod pests in the landscape. Recognition of pests and damage to trees, turf and ornamental plants.

ENTM 5370 URBAN ENTOMOLOGY (4) LEC. 3. LAB. 3. Pr. ENTM 3040 or ENTM 4020. Identification, biology and control of insect and other household arthropod pests.

ENTM 5500 BEE BIOLOGY AND MANAGEMENT (3) LEC. 2. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Biology and management of bees, with an emphasis on honey bees and beekeeping. May count either ENTM 5500 or ENTM 6500.

ENTM 5660 FIGURE FUNDAMENTALS : SCIENTIFIC ILLUSTRATION (3) LEC/STU. 1. Scientific illustration and data visualization implemented through the Adobe creative cloud package. May count either ENTM 5660, APBT 5660, or ENTM 6660.

ENTM 5700 VECTOR TRANSMISSION OF PLANT PATHOGENS (3) LEC. 3. Pr. BIOL 1030 or BIOL 1037. This course is designed to give students an understanding of vectors of plant pathogens. The use of case studies during this course is designed to show real world examples of plant pathogens which utilize insects as an important part of their lifecycle. May only count one of PLPA/ENTM 5700/6700.

ENTM 5820 PRINCIPLES AND TOOLS FOR REPRODUCIBLE SCIENCE IN AGRICULTURE (2) LEC. 2. Pr. STAT 2510. Reproducibility is fundamental to science. This course will cover basic concepts in scientific reproducibility, accessibility, and organization as it relates to handling large datasets and publishing data workflows.

ENTM 5920 INTERNSHIP (3) IND. 3. SU. Departmental approval. Practical professional experience under the supervision of internship faculty and a representative of a state, federal, or private agency.

ENTM 6120 MEDICAL-VETERINARY ENTOMOLOGY (4) LEC. 3. LAB. 3. Survey of insects, ticks, and mites of veterinary importance, emphasizing role as vectors of disease agents and the biology of pathogen-transmission cycles. Labs focus on methods of vector sampling and surveillance, identification, and case studies of special topics. May count either ENTM 5120 or ENTM 6120.

ENTM 6220 INSECT ECOLOGY (4) LEC. 3. LAB. 3. Pr. BIOL 3060. Departmental approval. Ecological interactions of insects and their environment, with emphasis on herbivory, predation, parasitism and mutualism, as well as population and community dynamics.

ENTM 6300 INSECT DIVERSITY (4) LEC. 3. LAB. 1. Pr. ENTM 3040 or ENTM 4020. Survey of the biodiversity of insects, stressing taxon diagnostics.

ENTM 6330 INTEGRATED PEST MANAGEMENT (3) LEC. 3. Aspects of pest management as a broad-based approach that integrates practices for economic control of pests. May count either ENTM/HORT/PLPA 5330/6330.

ENTM 6360 LANDSCAPE ENTOMOLOGY (4) LEC. 3. LAB. 3. Pr. (BIOL 1020 or BIOL 1027) or (BIOL 1030 or BIOL 1037). Identification and management of arthropod pests in the landscape. Recognition of pests and damage to trees, turf and ornamental plants.

ENTM 6370 URBAN ENTOMOLOGY (4) LEC. 3. LAB. 3. Pr. ENTM 3040 or ENTM 4020. Identification, biology and control of insect and other household arthropod pests.

ENTM 6440 INSECT MORPHOLOGY (5) LEC. 3. LAB. 6. Pr. ENTM 3040 or ENTM 4020. Departmental approval. Comparative external anatomy and generalized internal structures of insects. Characteristics used in taxonomy will be emphasized. Credit will not be given for both ENTM 5440 and ENTM 6440.

ENTM 6500 BEE BIOLOGY AND MANAGEMENT (3) LEC. 2. LAB. 2. Biology and management of bees, with an emphasis on honey bees and beekeeping. May count either ENTM 5500 or ENTM 6500.

ENTM 6660 FIGURE FUNDAMENTALS : SCIENTIFIC ILLUSTRATION (3) LEC. 2, LST. 1. Scientific illustration and data visualization implemented through the Adobe creative cloud package. May take either ENTM 5660, APBT 5660, or ENTM 6660.

ENTM 6700 VECTOR TRANSMISSION OF PLANT PATHOGENS (3) LEC. 3. This course is designed to give students an understanding of vectors of plant pathogens. The use of case studies during this course is designed to show real world examples of pathogens which utilize insects as an important part of their lifecycle. May only count one of PLPA/ENTM 5700/6700.

ENTM 6820 PRINCIPLES AND TOOLS FOR REPRODUCIBLE SCIENCE IN AGRICULTURE (2) LEC. 2. Reproducibility is fundamental to science. This course will cover basic concepts in scientific reproducibility, accessibility, and organization as it relates to handling large datasets and publishing data workflows.

ENTM 6920 INTERNSHIP (3) IND. 3. SU. Departmental approval. Practical professional experience under the supervision of internship faculty and a representative of a state, federal, or private agency.

ENTM 7100 GENERAL TOXICOLOGY (4) LEC. 3. LAB. 3. Pr. ENTM 3040 and CHEM 2030. Departmental approval. History, mechanism of action, metabolism, and structure activity relationship of natural and synthetic insecticides. Contemporary laboratory techniques in toxicology will be featured.

ENTM 7200 INSECT PHYSIOLOGY (4) LEC. 3. LAB. 3. Pr. ENTM 3040. Departmental approval. Introduction to insect physiology stressing structure and function of each organ system. Methods used in physiological research will be emphasized.

ENTM 7230 PRACTICAL EVOLUTION (3) LEC. 3. Pr. BIOL 5800 or BIOL 6800. Students will learn evolutionary biology by making it happen, that is, by building and running simulation models. They will also learn of opportunities to apply evolutionary theory to practical problems in agriculture, public health and conservation.

ENTM 7900 DIRECTED STUDIES IN ENTOMOLOGY I (1-5) LEC. SU. Discussion groups on specific topics, assigned readings, on laboratory problems or field research. Course may be repeated for a maximum of 5 credit hours.

ENTM 7950 SEMINAR (1) SEM. 1. SU. Presentation and discussion of scientific literature of thesis research findings. Required of all M.S. candidates.

ENTM 7960 SPECIAL PROBLEMS IN ENTOMOLOGY (1-4) LAB. 2-8. Departmental approval. Specialized project or research on a specific topic in entomology to be conducted under faculty supervision. Course may be repeated for a maximum of 4 credit hours.

ENTM 7990 RESEARCH AND THESIS (1-10) MST. Topics may focus on technical laboratory problems or field research related to arthropod biology. Admission to the M.S. Program. Course may be repeated with change in topics.

ENTM 8900 DIRECTED STUDIES IN ENTOMOLOGY II (5) LEC. 5. Discussion groups on specific topics, assigned reading on laboratory problems or field research.

ENTM 8910 TEACHING PRACTICUM (1) LAB. 2. SU. Departmental approval. Practical and theoretical issues of laboratory learning, and pedagogical facilitation. Required of all PhD students. Course may be repeated for a maximum of 3 credit hours.

ENTM 8930 JOURNAL REVIEW FOR ENTOMOLOGY AND PLANT PATHOLOGY (1) LEC. 1. Pr. ENTM 3040 and ENTM 4020 or (PLPA 3000 or PLPA 3003). Discussion of recent scientific publications on basic aspects of research in entomology and plant pathology. Course may be repeated for a maximum of 3 credit hours.

ENTM 8950 SEMINAR (1) LEC. 1. SU. Presentation and discussion of scientific literature or dissertation research findings. Required of all Ph.D. students.

ENTM 8960 ADVANCED SPECIAL PROBLEMS IN ENTOMOLOGY (1-4) LAB. 2-8. Departmental approval. Credit to be arranged. Specialized project or research on a specific topic in entomology to be conducted under faculty supervision. Course may be repeated for a maximum of 4 credit hours.

ENTM 8990 RESEARCH AND DISSERTATION (1-10) DSR. Admission to the Ph.D. Program. Course may be repeated with change in topics.

Plant Pathology Courses

PLPA 2000 PESTS, PATHOGENS, PARASITES, AND PEOPLE (3) LEC. 3. Past and present problems of pests and disease involving humans and the food chain.

PLPA 2980 INTRODUCTION TO UNDERGRADUATE RESEARCH (1-4) IND/RES. Departmental approval. Directed research in the area of specialty within the department. Course may be repeated for a maximum of 4 credit hours.

PLPA 3000 GENERAL PLANT PATHOLOGY (4) LEC. 3. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Survey of plant diseases common in Alabama, including symptom recognition, pathogen biology and management of plant diseases. Course credit will not be given for both PLPA 3000 and PLPA 3003/3004.

PLPA 4960 SPECIAL PROBLEMS IN PLANT PATHOLOGY (1-3) IND. Departmental approval. Supervised work on a project in plant pathology. Areas of study are: A. Mycology; B. Nematology; C. Virology; D. Bacteriology; E. Extension and Clinic Experience; F. Physiological and Molecular Approaches. Course may be repeated for a maximum of 3 credit hours.

PLPA 4980 UNDERGRADUATE RESEARCH (1-4) LAB. 2-8. Departmental approval. Directed research in the area of specialty within the department. Course may be repeated for a maximum of 4 credit hours.

PLPA 5050 PLANT DISEASE DIAGNOSIS (3) LEC. 1. LAB. 3. Pr. PLPA 3000 or PLPA 3003. Approaches, techniques, and practical experience in diagnosis of plant diseases. Credit will not be given for both PLPA 5050 and PLPA 6050. Summer.

PLPA 5200 MYCOLOGY (2) LEC. 1. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Biology of fungi with emphasis on taxonomy, morphology, physiology, genetics, reproduction, and how fungi interact with their ecosystems with an emphasis on plant pathogens. Credit will only be given to one of the following: PLPA 5200 or 6200.

PLPA 5250 MEDICAL AND VETERINARY MYCOLOGY (2) LEC. 2. A systematic survey of fungi and the diseases they cause on humans and animals.

PLPA 5300 PLANT-BACTERIAL INTERACTIONS (2) LEC. 1. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Comprehensive review of plant-bacterial interactions, including colonization, pathogenesis, symbiotic and associative nitrogen fixation, and transformation. Credit will only be given to one of the following: PLPA 5300 or PLPA 6300.

PLPA 5330 INTEGRATED PEST MANAGEMENT (3) LEC. 3. Aspects of pest management as a broad-based approach that integrates practices for economic control of pests. May count either ENTM/HORT/PLPA 5330/6330.

PLPA 5400 PLANT VIROLOGY (2) LEC. 1. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Plant viruses are one of the major pathogens causing problems in plants. This course will cover the fundamentals of plant viruses such as infectious cycle, genome, structure, and evolution. The course will also introduce applied biotechnology based on virus-plant interaction. Credit will only be given to one of the following: PLPA 5400 or PLPA 6400.

PLPA 5500 PLANT NEMATOLOGY (2) LEC. 1. LAB. 2. Pr. BIOL 1030 or BIOL 1037. Presentation of nematodes in relation to plant diseases, identification of plant nematodes; nature of pathogenicity; principles and practices of management; recent advances in phytonematology. Credit will only be given to one of the following: PLPA 5500 or PLPA 6500.

PLPA 5600 MOLECULAR PLANT-MICROBE INTERACTIONS (3) LEC. 3. Pr. BIOL 3000. Comprehensive coverage of present advances in plant defense-related metabolic pathways: how to recognize pathogen infections, and activate/potentiate disease resistances. Introduces biochemical, molecular and cellular mechanisms by which plants defend/assimilate themselves towards diverse a/biotic stress stimuli. Credit will only be given for one of the following courses: PLPA 5600 or PLPA 6600.

PLPA 5700 VECTOR TRANSMISSION OF PLANT PATHOGENS (3) LEC. 3. Pr. BIOL 1030 or BIOL 1037. This course is designed to give students an understanding of vectors of plant pathogens. The use of case studies during this course is designed to show real world examples of pathogens which utilize insects as an important part of their lifecycle. May only count one of PLPA/ENTM 5700/6700.

PLPA 5800 OMICS IN AGRICULTURE (3) LEC. 2. LAB. 2. Pr. BIOL 1030 or BIOL 3000 or AGRI 3000. This course will introduce students to the recent advances in high-throughput technologies such as genomics, transcriptomics, metagenomics, metabolomics, phenomics, modeling, and digital agriculture and how these technologies can be applied to tackling new and old problems in agriculture and human health. Students will be able to gain hands-on experience in analyzing and interpreting datasets obtained using these technologies.

PLPA 5820 PRINCIPLES AND TOOLS FOR REPRODUCIBLE SCIENCE IN AGRICULTURE (2) LEC. 2. Pr. STAT 2510. Reproducibility is fundamental to science. This course will cover basic concepts in scientific reproducibility, accessibility, and organization as it relates to handling large datasets and publishing data workflows.

PLPA 5920 INTERNSHIP (3) IND. 3. SU. Practical professional experience under the supervision of internship faculty and a representative of a state, federal, or private agency.

PLPA 6050 PLANT DISEASE DIAGNOSIS (3) LEC. 1. LAB. 3. Graduate level standing in PLPA, ENTM, AGRO, HORT, AGECE or Department approval. Experience with plant disease diagnosis procedures and the diagnosis of many common plant diseases. Summer.

PLPA 6200 MYCOLOGY (2) LEC. 1. LAB. 2. Biology of fungi with emphasis on taxonomy, morphology, physiology, genetics, reproduction, and how fungi interact with their ecosystems with an emphasis on plant pathogens. Graduate level standing or Departmental approval. Credit will only be given to one of the following: PLPA 5200 or PLPA 6200.

PLPA 6250 MEDICAL AND VETERINARY MYCOLOGY (2) LEC. 2. Pr. BIOL 3200. or prior approval of the instructor. A systematic survey of fungi and the diseases they cause on humans and animals.

PLPA 6300 PLANT-BACTERIAL INTERACTIONS (2) LEC. 1. LAB. 2. Comprehensive review of plant-bacterial interactions, including colonization, pathogenesis, symbiotic and associative nitrogen fixation, and transformation. Credit will only be given to one of the following: PLPA 5300 or PLPA 6300.

PLPA 6330 INTEGRATED PEST MANAGEMENT (3) LEC. 3. Aspects of pest management as a broad-based approach that integrates practices for economic control of pests. May count either ENTM/HORT/PLPA 5330/6330.

PLPA 6400 PLANT VIROLOGY (2) LEC. 1. LAB. 2. Plant viruses are one of the major pathogens causing problems in plants. This course will cover the fundamentals of plant viruses such as infectious cycle, genome, structure, and evolution. The course will also introduce applied biotechnology based on virus-plant interaction. Credit will only be given to one of the following: PLPA 5400 or PLPA 6400.

PLPA 6500 PLANT NEMATOLOGY (2) LEC. 1. LAB. 2. Presentation of nematodes in relation to plant diseases, identification of plant nematodes; nature of pathogenicity; principles and practices of management; recent advances in phytonematology. Credit will only be given to one of the following: PLPA 5500 or PLPA 6500.

PLPA 6600 MOLECULAR PLANT-MICROBE INTERACTIONS (3) LEC. 3. Comprehensive coverage of present advances in plant defense-related metabolic pathways: how to recognize pathogen infections, and activate/potentiate disease resistances, biochemical, molecular and cellular mechanism by which plants defend/assimilate themselves towards diverse a/biotic stress stimuli. Credit will only be given for one of the following courses: PLPA 5600 or PLPA 6600.

PLPA 6700 VECTOR TRANSMISSION OF PLANT PATHOGENS (3) LEC. 3. This course is designed to give students an understanding of vectors of plant pathogens. The use of case studies during this course is designed to show real world examples of pathogens which utilize insects as an important part of their lifecycle. May only count one of PLPA/ENTM 5700/6700.

PLPA 6800 OMICS IN AGRICULTURE (3) LEC. 2. LAB. 2. This course will introduce students to the recent advances in high-throughput technologies such as genomics, transcriptomics, metagenomics, metabolomics, phenomics, modeling, and digital agriculture and how these technologies can be applied to tackling new and old problems in agriculture and human health. Students will be able to gain hands-on experience in analyzing and interpreting datasets obtained using these technologies.

PLPA 6820 PRINCIPLES AND TOOLS FOR REPRODUCIBLE SCIENCE IN AGRICULTURE (2) LEC. 2. Reproducibility is fundamental to science. This course will cover basic concepts in scientific reproducibility, accessibility, and organization as it relates to handling large datasets and publishing data workflows.

PLPA 6920 INTERNSHIP (3) IND. 3. SU. Departmental approval. Practical professional experience under the supervision of internship faculty and a representative of a state, federal, or private agency.

PLPA 7080 FIELD SURVEY OF PLANT PATHOLOGY (3) LEC. 1. LAB. 6. Practical aspects of plant diseases under field conditions, on-site visits via field trips; discussion of experimental design for field research. Summer.

PLPA 7860 PLANT DISEASE EPIDEMIOLOGY (2) LEC. 2. Pr. PLPA 3000. Aspects of plant disease epidemiology including disease assessment and temporal progress, pathogen spread, and yield loss determination.

PLPA 7861 PLANT DISEASE EPIDEMIOLOGY LABORATORY (2) LAB. 4. Coreq. PLPA 7860. Quantitative aspects of plant disease epidemiology including spatial and temporal modeling, and disease system simulation.

PLPA 7880 PLANT MICROBIAL ECOLOGY (3) LEC. 3. LAB. 0. Concepts in ecology of plant-associated microbes and their interactions with plants using molecular approaches.

PLPA 7881 PLANT MICROBIAL ECOLOGY LABORATORY (2) LAB. 4. This course will involve hands-on experience with genomic, metagenomic, transcriptomic datasets. Graduate standing in the College of Agriculture/COSAM.

PLPA 7900 DIRECTED STUDIES IN PLANT PATHOLOGY (1-5) LEC. SU. Discussion groups on specific topics, assigned reading on laboratory problems or field research.

PLPA 7910 TEACHING PRACTICUM (1) LAB. 2. SU. Graduate level standing in PLPA or ENTM or Departmental approval. The teaching practicum will address the practical and heretical issues of laboratory learning and facilitating the skills of pedagogy. Course may be repeated for a maximum of 3 credit hours.

PLPA 7930 JOURNAL REVIEW FOR ENTOMOLOGY AND PLANT PATHOLOGY (1) LEC. 1. Graduate level standing in PLPA, ENTM, AGRO, HORT, AGECE or Department approval. Discussion of recent scientific publications on basic aspects of research in entomology and plant pathology. Course may be repeated for a maximum of 2 credit hours.

PLPA 7950 SEMINAR IN PLANT PATHOLOGY (1) SEM. 1. SU. Departmental approval. Seminar presentations on current departmental research and current issues in plant pathology and related disciplines. Fall, Spring. Course may be repeated for a maximum of 2 credit hours.

PLPA 7960 SPECIAL PROBLEMS IN PLANT PATHOLOGY (1-4) LAB. 2-8. Departmental approval. Credit to be arranged. Specialized project or research on a specific topic in plant pathology to be conducted under faculty supervision. Course may be repeated for a maximum of 4 credit hours.

PLPA 7970 SPECIAL TOPICS IN PLANT PATHOLOGY (1-5) ST1. Advanced topics related to plant pathology. Course may be repeated for a maximum of 5 credit hours.

PLPA 7990 RESEARCH AND THESIS (1-10) MST. Departmental approval. Research and thesis on problems in plant pathology. Course may be repeated with change in topics.

PLPA 8880 MOLECULAR PLANT PATHOLOGY (3) LEC. 2. LAB. 2. Open discussion and article review on current topics and cutting-edge discoveries in the field of molecular plant pathology, covering the cellular mechanisms of plant interactions with, and immune responses against pathogens.

PLPA 8900 DIRECTED STUDIES IN PLANT PATHOLOGY (1-5) LEC. SU. Discussion groups on specific topics, assigned reading on laboratory problems or field research. Course may be repeated for a maximum of 5 credit hours.

PLPA 8910 TEACHING PRACTICUM (1) LAB. 2. SU. Departmental approval. Practical and theoretical issues of laboratory learning, and pedagogical facilitation. Required of all PhD students. Course may be repeated for a maximum of 3 credit hours.

PLPA 8930 JOURNAL REVIEW FOR ENTOMOLOGY AND PLANT PATHOLOGY (1) LEC. 1. Graduate level standing in PLPA, ENTM, AGRO, HORT, AGECE or Department approval. Discussion of recent scientific publications on basic aspects of research in entomology and plant pathology. Course may be repeated for a maximum of 3 credit hours.

PLPA 8950 SEMINAR (1) SEM. 1. SU. Departmental approval. Presentations and discussion of scientific literature or dissertation research findings. Required for all Ph.D. candidates. Fall, Spring. Course may be repeated for a maximum of 2 credit hours.

PLPA 8960 ADVANCED SPECIAL PROBLEMS IN PLANT PATHOLOGY (1-4) LAB. 2-8. Departmental approval. Credit to be arranged. Specialized project or research on a specific topic in plant pathology to be conducted under faculty supervision. Course may be repeated for a maximum of 4 credit hours.

PLPA 8990 RESEARCH AND DISSERTATION (1-10) DSR. Departmental approval. Research and dissertation on problems in plant pathology. Course may be repeated with change in topics.