Plant Pathology (PP)

PP 144/HS 144 Weeds & Diseases of Ornamentals (3 credit hours)
The objective of this course is to give students a fundamental and practical understanding of weed, disease, and pesticide management in the ornamental industries in North Carolina. Agricultural Institute students only.

Requisite: Agricultural Institute Only
Typically offered in Fall only

PP 150 Introduction to Plant Molecular Biology (3 credit hours)
Hands-on introduction to modern molecular biology techniques. Isolation of SNA from tobacco leaves, isolating a plant gene through polymerase chain reaction (PCR), cloning DNA fragments in plasmid vectors, bacterial transformation and plasmid DNA purification, restriction digestion and gel electrophoresis, gene transfer and expression of reporter genes in plant cell lines through a biolistic gene gun. Field trips, poster assignment and poster presentation are mandatory. This course is part of the Summer College in Biotechnology and Life Sciences (SCIBLS) and other pre-college, transitional and early-college programs. Students must have no more than 30 credit hours. Deparment approval required.

Typically offered in Summer only

PP 154/CS 154 Turf Weed and Disease Management (3 credit hours)
General principles in turfgrass weed and disease development and management programs. Different weeds, their life cycles, management techniques, and factors affecting herbicide application performance will be covered. Students will learn the causes, development, identification and management of turfgrass diseases. Laboratory includes weed identification and herbicide application methods. Certain laboratory exercises will require personal transportation to Lake Wheeler Road Turf Field Lab unless otherwise specified by the lab instructors. The course is restricted to AGI students only.

Requisite: Agricultural Institute Only
Typically offered in Fall only

PP 155 Diseases of Ornamentals and Turfgrasses (3 credit hours)
Causes, development, identification and management of diseases of greenhouses and landscape ornamentals and turfgrasses. WARFIELD

Requisite: Agricultural Institute Only
Typically offered in Fall only

PP 222 Kingdom of Fungi (3 credit hours)
Influence and impact of fungi in our world. The role of fungi in history, ecology, medicine, human and plant diseases, industry, food, and politics. Mushrooms, molds, mildews, and symbiosis.

Prerequisite: BIO 105 or 106 or 140 or 181 or 183 or PB 200 or 215 or 219 or 220 or 250 or MB 200
GEP Natural Sciences
Typically offered in Fall and Spring

PP 232 Big Data in Your Pocket: Call it a Smartphone (3 credit hours)
Data have been, are, and will be collected in every scientific discipline. Data provide a foundation to evaluate hypotheses and advance knowledge. For centuries scientists have collected data and built models separately with methods and principles defined in their disciplines. Modern technological advances have resulted in a data revolution. Data now come fast in all forms and in high volumes, presenting both new challenges and opportunities in many disciplines. In this course we will discuss how data is collected and visually summarized and how modern technology has allowed for the collection of big data, resulting in a revolution in the way we live, work, and think.

GEP Interdisciplinary Perspectives
Typically offered in Fall only

PP 241 The Worm's Tale: Parasites In Our Midst (3 credit hours)
This is a 3 credit hour survey course on the impact of parasites on society, including development and exploration, wars and expansion, agriculture, health and medicine, economic impacts, political impacts, and attempts at control/management. From the fiery serpent to the scourge of malaria, parasitic organisms have played a significant, and sometimes pivotal role in the development and progress of human society. This course presents an overview that provides students the necessary information and resources to understand this ubiquitous and critically important group of organisms. Parasites represent a significant hurdle to overcome as global society continue to move forward.

GEP Interdisciplinary Perspectives
Typically offered in Spring only

PP 315 Principles of Plant Pathology (4 credit hours)
Fundamental principles of plant pathology with emphasis on disease etiology, nature of pathogenesis, ecology of host/parasite interaction, epidemiology of plant diseases, current strategies and practices for integrated disease control.

Typically offered in Fall only

PP 318/FOR 318 Forest Pathology (3 credit hours)
Major diseases of forest trees and deterioration of wood products emphasizing principles of plant pathology; diagnosis; nature, physiology, ecology, and dissemination of disease-causing agents; mechanisms of pathogenesis; epidemiology and environmental influences; principles and practices of control.

Prerequisite: PB 200
Typically offered in Fall and Spring

PP 470/CS 470/ENT 470 Advanced Turfgrass Pest Management (2 credit hours)
Characteristics and ecology of turfgrass weed, insect, and disease pests; identification and diagnosis of turfgrass pests, strategies for managing pests including cultural, mechanical, biological, and chemical methods; development of integrated pestmanagement programs, characteristics and modes of action for herbicides, insecticides, fungicides, and plant growth regulators; behavior and fate of pesticides in soil; and the development and management of pesticide resistant pest populations.

Prerequisite: C- or better in CS 200
Typically offered in Spring only

PP 492 External Learning Experience (1-6 credit hours)
A learning experience in agriculture and life sciences within an academic framework that utilizes facilities and resources which are external to the campus. Contact and arrangements with prospective employers must be initiated by student and approved by a faculty adviser, the prospective employer, the departmental teaching coordinator and the academic dean prior to the experience.

Prerequisite: Sophomore standing
Typically offered in Fall and Spring

PP 493 Special Problems in Plant Pathology (1-6 credit hours)
A learning experience in agriculture and life sciences within an academic framework that utilizes campus facilities and resources. Contact and arrangements with prospective employers must be initiated by student and approved by a faculty adviser, the prospective employer, the departmental teaching coordinator and the academic dean prior to the experience.

Prerequisite: Sophomore standing
Typically offered in Fall and Spring

PP 495 Special Topics in Plant Pathology (1-3 credit hours)
Offered as needed to present materials not normally available in regular course offerings or for offering of new courses on a trial basis.

Typically offered in Fall, Spring, and Summer

PP 501/PB 501/MB 501 Biology of Plant Pathogens (3 credit hours)
Biology of microbes that cause plant diseases. The ecology, genetics, physiology, taxonomy, and mechanisms of parasitism, pathogenicity and virulence of bacteria (and other prokaryotes), fungi (and oomycetes), nematodes, and viruses that cause plant diseases. Prepares graduate students for advanced courses in plant pathology, host-parasite interactions, and provides a knowledge base for students in other disciplines involved with plant pathogens or who seek to broaden their knowledge of microbes.

Prerequisite: PP 315, or PP 318, or an introductory course in microbiology
Typically offered in Fall only

PP 502/CS 502/HS 502 Plant Disease: Methods & Diagnosis (2 credit hours)
Introduction to the basic principles of disease etiology in plants and the methods used to research and diagnose plant diseases caused by bacteria (and other prokaryotes), fungi (and oomycetes), nematodes and viruses. Lab-based course intended to give graduate students a practical, hands-on research experience for diagnosing and characterizing each plant pathogen group. Introduction to pathogen-specific as well as more general experimental techniques utilized in plant pathology. No course prerequisites, but prior experience in microbiology and/or completion of PP 315, PP 501 or equivalent will benefit the PP 502 learning experience.

Prerequisite: Graduate standing or department consent
Typically offered in Fall only

PP 506 Epidemiology and Plant Disease Control (3 credit hours)
Consideration of fundamental concepts and principles of epidemiology as applied to modern strategies of plant disease control. Special consideration given to evaluation of current techniques for control of fungal, bacterial, viral and nematode pathogens in an integrated crop protection system.

Prerequisite: PP 315 or PP 318
Typically offered in Spring only

PP 575/PB 575/MB 575 Introduction to Mycology (4 credit hours)
A survey of the fungal kingdom in context of phyla and classes. Systematics, ecology, biology and utilization. Illustrative material, cultural techniques in laboratories. Collection and paper required.

Prerequisite: BS 125 or BS 181 and 183 or BO 200 or PP 315 or PP 318
Typically offered in Fall only

PP 590 Special Topics (1-3 credit hours)
The study of special problems and selected topics of current interest in plant pathology and related fields.

Typically offered in Fall, Spring, and Summer

PP 601 Seminar (1 credit hours)
Discussion of assigned phytopathological topics.

Typically offered in Fall and Spring

PP 610 Special Topics (1-6 credit hours)
The study of special problems and selected topics of current interest in plant pathology and related fields.

Typically offered in Fall, Spring, and Summer

PP 615 Advanced Special Topics in Plant Pathology (1-6 credit hours)
Offered as needed to present materials not normally available in regular course offerings or for offering of new courses on a trial basis.

Prerequisite: PP 501, 502, Corequisite: ST 511
Typically offered in Fall only

PP 620 Special Problems (1-6 credit hours)
Investigation of special problems in plant pathology not related to thesis problem. Investigations may consist of original research and/or literature survey.

Typically offered in Fall and Spring

PP 685 Master's Supervised Teaching (1-3 credit hours)
Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment and evaluate the student upon completion of the assignment.

Prerequisite: Master's student
Typically offered in Fall and Spring

PP 690 Master's Examination (1-9 credit hours)
For students in non thesis master's programs who have completed all other requirements of the degree except preparing for and taking the final master's exam.

Prerequisite: Master's student
Typically offered in Spring only

PP 693 Master's Supervised Research (1-9 credit hours)
Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Master's student
Typically offered in Fall and Spring

PP 695 Master's Thesis Research (1-9 credit hours)
Thesis research.

Prerequisite: Master's student
Typically offered in Fall, Spring, and Summer

PP 696 Summer Thesis Res (1 credit hours)
For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Typically offered in Summer only

PP 699 Master's Thesis Preparation (1-9 credit hours)
Original research in plant pathology.

Prerequisite: Graduate standing
Typically offered in Spring only

PP 707 Plant Microbe Interactions (3 credit hours)
Fundamental concepts and current status of research on the physiology, biochemistry and molecular biology of host-pathogen interactions during plant disease. Topics include recognition, penetration and colonization, pathogenicity and virulence determinants, resistance mechanisms, sign transduction, programmed cell death, and other current topics. Information presented in context of virual-, bacterial-, fungal-and nematode-plan interactions.Credit cannot be received for both PP 507 and PP 707

Prerequisite: PP 501
Typically offered in Spring only

PP 715/MB 715 Applied Evolutionary Population Genetics (3 credit hours)
This course will introduce students to nonparametric and model-based methods for making inferences on population processes (i.e., mutation, migration, drift, recombination, and selection). The goal is to provide a conceptual overview of these methods in lectures and hands-on training on how to analyze and interpret sample data sets in guided computer lab sessions. The course will leverage the tools and resources implemented in the DeCIFR toolkit (https://decifr.cifr.ncsu.edu/). DeCIFR is a comprehensive suite of biodiversity informatics pipelines and visualization tools to discover, evaluate, and describe taxa at multiple spatial and phylogenetic scales. Students will apply these tools to estimate population parameters in different organisms with a focus on eukaryotic microbes, viruses, and bacteria.

Prerequisite: PP 707 or GN 703 or ST 501
Typically offered in Fall only

PP 727/ENT 727 Ecology of Soil Ecosystems (3 credit hours)
This course will focus on the interactions between soil organisms and their environment, and the ecological consequences of these diverse complex interactions. In particular, it will explore the scientific evidence that illustrates links between soil organisms, ecosystem functioning and the quality of air and water systems, and examine why and how the related research was conducted. This course will bring together theory and research trends from distinct subject areas: soil microbiology, entomology and ecosystem ecology.

Prerequisite: One course in: (SSC 332, SSC 511, SSC 521, or SSC 532), or ecology (BO 360 or CS 430), or microbiology (MB 351), or consent of instructor.
Typically offered in Spring only

PP 755 Plant Disease Resistance: Mechanisms and Applications (3 credit hours)
In this course, we will discuss the genetic and biochemical concepts underlying plant disease resistance and the tools and techniques used to introduce desirable levels of disease resistance into new crop cultivars, including conventional and modern breeding techniques and genetic engineering. We discuss responses of plant pathogen populations to the host resistance, and strategies to maximize the durability of resistance. Lastly, methods of breeding for disease resistance will be discussed.

P: Basic Undergraduate Level Genetics Class (GN 311) and an Introductory Plant Pathology Course (PP315, PP318 or PP501) or equivalent course.
Typically offered in Spring only

PP 790 Special Topics (1-6 credit hours)
The study of special problems and selected topics of current interest in plant pathology and related fields.

PP 795 Advanced Special Topics (1 credit hours)
Critical study of special problems and selected topics of current interest in plant pathology and related fields.

PP 801 Seminar In Plant Pathology (1 credit hours)
Discussion of assigned phytopathological topics.

Typically offered in Fall and Spring

PP 810 Special Topics (1-6 credit hours)
The study of special problems and selected topics of current interest in plant pathology and related fields.

Typically offered in Fall, Spring, and Summer

PP 815 Advanced Special Topics (1-6 credit hours)
Critical study of special problems and selected topics of current interest in plant pathology and related fields.

Typically offered in Fall and Spring

PP 820 Special Problems In Plant Pathology (1-6 credit hours)
Investigation of special problems in plant pathology not related to thesis problem. Investigations may consist of original research and/or literature survey.

Typically offered in Fall and Spring

PP 885 Doctoral Supervised Teaching (1-3 credit hours)
Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Doctoral student
Typically offered in Fall and Spring

PP 890 Doctoral Preliminary Examination (1-9 credit hours)
For students who are preparing for and taking written and/or oral preliminary exams.

Prerequisite: Doctoral student
Typically offered in Spring only

PP 893 Doctoral Supervised Research (1-9 credit hours)
Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Doctoral student
Typically offered in Fall and Spring

PP 895 Doctoral Dissertation Research (1-9 credit hours)
Dissertation Research

Prerequisite: Doctoral student
Typically offered in Fall, Spring, and Summer

PP 896 Summer Dissertation Research (1 credit hours)
For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Doctoral student
Typically offered in Summer only

PP 899 Doctoral Dissertation Preparation (1-9 credit hours)
For students who have completed all credit hour requirements, full-time enrollment, preliminary examination, and residency requirements for the doctoral degree and are writing and defending their dissertations.

Prerequisite: Doctoral student
Typically offered in Spring only