

HANDBOOK

for

GRADUATE STUDENTS

In the

DEPARTMENT OF

PLANT PATHOLOGY



UNIVERSITY OF
ARKANSAS
DALE BUMPERS COLLEGE
OF AGRICULTURAL, FOOD
& LIFE SCIENCES

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An Open Letter to Our New Graduate Students

Dear New Graduate Student:

Welcome to the scientific community. The Department of Plant Pathology at University of Arkansas has a long history of contributing to the sciences and training graduate students. You are here to obtain a research degree, but also position yourself for a career in which you will impact what we know, how we conduct research, and the quality and sustainability of the world we live in. As a graduate student, you are expected to conduct original research and report this research in a thesis or dissertation and scientific publications. As part of this process, you will develop strong personal and professional relationships with the faculty and fellow graduate students, as well as colleagues around the world, that will be maintained for the rest of your life.

Our mission in the Department is two-fold. First, to help you develop to your fullest potential as a person; and second, to contribute to the body of scientific knowledge. This manual contributes to these objectives by presenting the policies which will allow you to progress through your program.

It is important that you are familiar with all the items in this document and where to go to obtain current information. You need to be aware of your responsibilities as a graduate student and as an employee of the Department. Your advisor, advisory committee and the office staff can assist you with procedures and help with any concerns or problems you may have, but you are the principle person responsible for completing your degree.

The programs in the Department of Plant Pathology are research degrees and as such will require greater time management skills and organization on your part than a classroom degree. Research degrees are intended to be amenable to your career goals and thus each student's program will appear different and each advisor may direct a graduate student differently. This variability is a reflection of personal philosophy, the discipline involved, and resources available to the professor and student. Tailoring your program to your interests and goals is one of the strengths of the graduate programs and should allow you to development to your fullest potential.

Let me know if I can help make your experience more rewarding. Our students and their success play a large role in our reputation in the sciences, so we are vested in your success. Don't be a stranger. You are a member of the plant pathology community.

Sincerely,

Craig Rothrock
Professor and Interim Department Head

Table of Contents

	Page
Letter to New Students	2
Mission Statement	4
Faculty in Plant Pathology	5
List of Courses	7
Requirements for Graduate Standing	8
Responsibilities of the Graduate Programs	9
Responsibilities of the Graduate Students	10
Guidelines for Master of Science in Plant Pathology	11
Guidelines for the Doctor of Philosophy in Plant Science	13
Guidelines for CEMB Program	
Plant Pathology Seminar and Other Requirements	
University Services and Programs	
Departmental Information	Tab 1
Graduate School Student Handbook	Tab 2
Graduate Procedures and Responsibilities	Tab 3
Appendix 1	Tab 4

MISSION STATEMENT

DEPARTMENT OF PLANT PATHOLOGY
UNIVERSITY OF ARKANSAS
FAYETTEVILLE

Plant pathologists strive to understand disease causing agents, the nature of disease, and develop methods and approaches to minimize the impact of disease on food, fiber and ornamental plants. Because most plant diseases result from the interactions of a host with a pathogen in a particular environment, plant pathologists must be broadly educated and experienced in many disciplines including biochemistry, botany, genetics, molecular biology, microbiology, mycology, nematology, virology, and bacteriology.

The mission of the Department of Plant Pathology at the University of Arkansas is to conduct basic and problem-oriented research that generates, disseminates and applies the knowledge of plant diseases and their causal agents. This is done in order to minimize crop losses, ensure sustainable agricultural productivity and enhance the stewardship of our natural resources and the environment.

The Department of Plant Pathology at the University of Arkansas was founded in 1909 and has a strong tradition in plant pathology research and education. The Department offers programs leading to the Master of Science and Doctor of Philosophy degrees. The M.S. and Ph.D. programs offer intensive, research-oriented education and training in both the applied and fundamental aspects of the science of plant pathology. Research topics range from molecular aspects of disease and pathogens to applied research on disease control methods for major food and fiber crops.

Graduate Programs: Graduate programs in the Department of Plant Pathology provide professional education and training leading to an M.S. in Plant Pathology or Cell and Molecular Biology, or a Ph.D. in Plant Science or Cell and Molecular Biology. All programs are accredited by the North Central Association of Colleges and Secondary Schools. Students can enter the graduate programs in the department from many areas of undergraduate emphasis, however, a background in the biological sciences is very desirable. Previous course work in plant pathology is helpful, but not necessary. Original research that culminates in a thesis or dissertation is required of all graduate students. Although the degrees are research oriented, the graduate programs prepare students for careers in research, teaching and public service. Previous graduates are employed by industry, governmental agencies, educational institutions, and foundations. The only graduate program in Plant Pathology in Arkansas is at the University of Arkansas, Fayetteville.

The Department of Plant Pathology is housed in the Plant Sciences Building and the Rosen Alternative Pest Control Center located on the University of Arkansas campus.

Both facilities contain modern laboratories and offices, and the Rosen Center is equipped with state-of-the-art greenhouses and plant growth chambers. The Cralley-Warren Laboratory, located two miles from campus on the Arkansas Agricultural Research and Extension Center Farm in Fayetteville houses the Nematology program. In addition, faculty are located at several locations in the state. The Plant Diagnostic Laboratory is also located at the Research and Extension Center in Fayetteville. Field research can be conducted at one of the five Research and Extension Centers, one of the numerous research stations located throughout Arkansas, or in producers' fields.

Faculty of the Department of Plant Pathology

Burton H. Bluhm (Ph.D., Purdue University) Molecular plant pathology; Corn Pathology - conducts research on the molecular basis of mycotoxin biosynthesis by ear rot pathogens, identifying kernel properties; and Soybean Pathology – identifying resistance to *C. sojina* and soybean Sudden Death Syndrome (SDS) by characterizing genes in the pathogen required for virulence.

James C. Correll (Ph.D., University of California, Berkeley) Vegetable Diseases; conducts research on vegetable diseases and their control with emphasis on diseases of cucurbits and spinach; and population structures of plant pathogenic fungi.

Martin Egan (Ph.D., University of Exeter, UK) Host-Pathogen Interactions.

Travis Faske (Ph.D. Texas A&M) Extension Plant Pathologist . His applied research focused on fungal diseases and nematodes in corn, cotton, and soybean. He also initiated projects on peanut which is an emerging market in Arkansas.

Terrence L. Kirkpatrick (Ph.D., North Carolina State University) Field Crop Diseases; SWREC, conducts research on diseases of field crops and their control with emphasis on nematodes of cotton, soybeans, and vegetables.

K.L. Korth (Ph.D., North Carolina State University) Molecular interactions of plants and pests; conducts research on plant responses to herbivory and insect-derived factors.

Robert T. Robbins (Ph.D., North Carolina State University) Plant Nematology; innovative and comprehensive basic and applied research on the systematics, biology, ecology and management of plant parasitic nematodes.

Clemencia Rojas (Ph.D. Plant Pathology, Cornell University) Research in my lab focuses on identifying plant genes conferring broad resistance against bacterial pathogens.

Craig S. Rothrock (Ph.D., University of Illinois) Soilborne Diseases and Soil Ecology; conducts research on diseases caused by soilborne plant pathogens and their control using cultural, chemical and alternative strategies.

John C. Rupe (Ph.D., University of Kentucky) Soybean Diseases, conducts research on the epidemiology of plant pathogens with emphasis on soybean diseases and their control, especially sudden death syndrome and charcoal rot.

Sherrie Smith Instructor and Plant Diagnostician at the Plant Health Clinic

Ples Spradley Extension Pesticide Specialist. Coordinates the Pesticide Safety Education Program.

Terry Spurlock (Ph.D. University of Arkansas) Extension Plant Pathologist responsible for extension and outreach on management of foliar diseases of soybean, corn, cotton and row crops through applied research in resistance, cultural and protection practices

Ioannis E. Tzanetakis (Ph.D., Oregon State University) Plant Virology; conducts research on the epidemiology of small fruit crops, ornamentals and soybean and gene function of RNA viruses.

Yeshe Wamishe (Ph.D., University of Arkansas) Extension Plant Pathologist. Conducts research in rice.

**Courses Offered by the Department of Plant Pathology
Dale Bumpers College of Agricultural Food and Life Sciences
University of Arkansas, Fayetteville**

<u>Course Number</u>	<u>Course Title / Instructor</u>
PLPA 3004	<i>Principles of Plant Pathology / Rothrock</i>
PLPA 4223	Plant Disease Control / Rupe
PLPA 4304	Applied Plant Disease Management / Correll
PLPA 4333	Biotechnology in Agriculture / Korth
PLPA 5001	Seminar/ Rotating Faculty Members
PLPA 502V	Special Problems Research/ the Faculty
PLPA 504V	Special Topics / the Faculty
PLPA 5303	Advanced Plant Pathology: Host-Pathogen Interactions/ Korth and Egan
PLPA 5313	Advanced Plant Pathology: Ecology and Epidemiology/ Rupe, Rothrock, and Correll
PLPA 5404	Diseases of Economic Crops / Correll, Kirkpatrick, Rothrock, and Rupe,
PLPA 5603	Plant Pathogenic Fungi / Bluhm
PLPA 6203	Plant Virology / Tzanetakis
PLPA 6303	Plant Nematology / Robbins
PLPA 6503	Plant Bacteriology/Rojas
PTSC 6101	Colloquium in Plant Sciences/ Rotating Faculty Members

REQUIREMENTS FOR GRADUATE STANDING

Graduate students must comply with all policies, procedures and standards described by both the Graduate School and the Department of Plant Pathology in order to maintain graduate student standing in the Department of Plant Pathology. The student is responsible for adhering to regulations outlined by the Graduate School Catalog and Student Handbook and those stated in all Department policies.

Important deadlines can be met only if the student is familiar with criteria in the catalog and with notifications that are published periodically, particularly during registration procedures.

APPOINTMENTS

Assistantships

Acceptance of an assistantship constitutes a contractual agreement with the University of Arkansas. Graduate Assistants are employees and their appointments extend to the end of their annual contracts. The MS or PhD degree is expected to be completed in two years and four or five years, respectively, by graduate research assistants enrolled in degree programs.

M.S.	4 semesters (beyond the Bachelors)
Ph.D.	8 semesters (beyond the Masters)
Ph.D.	10 semesters (beyond the Bachelors)

The above time limits do not include summer sessions but do include the semester in which an assistantship begins even if it begins in mid-session. Assistantships will be withdrawn after completion of the final semester.

Other Financial Aid

In addition to the base assistantship provided by the department or required by the University, all assistantships are supplemented by their advisor. Domestic graduate students are eligible for various kinds of support through federally funded programs. Occasionally, other scholarships or grants are made available that may be awarded to graduate students. Funds for such grants fluctuate with contributors. Minority scholarships or fellowships are often available. Applications may be secured from and any questions directed to Financial Aid Office, Rm. 104 Hunt Hall, Fayetteville, AR 72701 or from the Graduate School. The Departmental office also has a file on scholarships available. In addition, there are a number of annual awards available to graduate students in the department.

If the student is making sufficient progress and additional time is required to finish the degree, the student should work with their advisor for employment options to finish the

degree.

Registration

A schedule of classes for each semester can be acquired online at <https://uaconnect.uark.edu/> Brief descriptions of courses and prerequisites are found in the Graduate Catalog available online at: <http://registrar.uark.edu/465.php> . Courses for a student's program are made in consultation with their advisor and advisory committee.

RESPONSIBILITIES OF THE GRADUATE PROGRAM

Responsibilities of the Department Head

The Department Head is the chief executive for the faculty, staff and students in the department. He or she serves as an ex-officio member of all committees and may advise any committee member, the major professor, or the student in regard to quality of the student's performance.

Recent legislation requires each department to have an educational assessment plan for the evaluation of students as they finish their advanced degrees. In plant pathology, this plan includes an oral exit interview with the department head in addition to the oral defense normally required for the degree. Rubrics have been developed to standardize the evaluation of the progress of the students.

See Appendix 1 for rubric.

Responsibilities of the Major Professor

The major professor assists the student in choosing his or her graduate research project and provides advice throughout the student's graduate program. The method and philosophy of developing and carrying out a graduate program should rest with the major professor in consultation with the student's advisory committee. The major professor must approve all course work and review the progress of the student regularly. The advisor should approve the student's thesis/dissertation before it is submitted to the advisory committee and should examine the final copy of the thesis/dissertation that is submitted to the Graduate School before affixing his/her signature to denote approval of the quality of the research and the mechanical and literary quality of the document.

Responsibilities of the Advisory Committee

Members of the advisory committee, appointed by the major professor and the department head or program director, are an advisory committee to both the major professor and the graduate student. The student's committee serves both as an advisory committee for his or her graduate program and as a thesis/dissertation committee. The

student should seek the help of any member of the committee whenever it becomes desirable during the course of study. Any major changes in the course work or research will be done in consultation with the committee members. A member of the advisory committee may serve to advise the student in a special area of expertise and can coordinate portions of the student's research in agreement with the major professor. The signature of a member of the advisory committee on the student's thesis/dissertation indicates that the committee member believes the quality of both the research and the thesis/dissertation merits approval.

RESPONSIBILITIES OF THE GRADUATE STUDENT

To the Department

Graduate Research Assistants are employees and are expected to be actively working throughout the year on their research or as part of the advisor's program. In addition, the graduate student should consider their position a professional obligation and fulfill responsibilities with full regard for professional ethics. Problems that arise should be discussed first with their major professor. If their major professor **cannot deal with a problem**, you may wish to see the department head or program director.

As a graduate student involved in research, the student may sometimes be responsible for sharing data or materials or negotiating with other institutions, industries, or individuals in relation to research funds, supplies, or services. Their communications with such individuals should be conducted with full approval of your advisor and understanding of university policies and regulations.

GUIDELINES FOR MASTER OF SCIENCE IN PLANT PATHOLOGY

Admission

After admission to the Graduate School and the MS program in the Plant Pathology Department, the student will be assigned to a major professor. Applicants are given equal consideration without regard to race, color, sex, creed, sexual preference, or national origin.

The major professor, in consultation with the student and with the approval of the Head of the Department, will form a graduate advisory committee consisting of at least three members (including the major professor) at the first practical opportunity. The committee will consist of graduate faculty members representing the department and **at least one** member from a relevant field outside the Department. It is expected that this will be completed in the first semester of a graduate student's program.

The Head of the Department will be an ex-officio (by virtue of office) member of all committees. The student or major professor must contact the prospective committee members to determine whether those faculty are willing to serve on the student's committee.

The major professor will, at the earliest opportunity, call a meeting of the student and committee. The student should present a tentative outline of the course work (minimum of 24 course hours and six thesis hours) and a research proposal on the objectives and procedures involved in the thesis. The committee along with the student will establish a definite plan of study and research at this time or, if necessary, in a second such meeting. The committee will be informed, at the conclusion of each semester, of the progress being made. Major changes in the student's coursework or research must be done in consultation with the committee members.

An outline of the student's plan of study will be completed by the student and major professor, and copies should be forwarded to the Head of the Plant Pathology Department, graduate coordinator, and members of the graduate committee for their files.

Academic Requirements for the Master of Science in Plant Pathology

The basic course requirements for each degree candidate in the MS program will be arranged on an individual basis by the student and their Advisory Committee and must include a minimum of 24 graduate level hours in course work plus 6 hours of thesis credit. If a student has not taken an introductory course in plant pathology prior to being accepted in the program, the student must take PLPA 502V Special Problems – Plant Pathology Principles for two credits or make other provisions to satisfy this deficiency.

No more than 3 hours of Seminar and 6 hours of Special Problems may be included in the 30 hours.

Minimum course work requirements for completion of the Master of Science Program in Plant Pathology:

<u>Credits</u>	<u>Course work</u>
(3)	Concept Courses ^a
(3)	Seminar ^b
(3)	Discipline Courses ^c
(15)	Electives ^d
(6)	Thesis
30	Total

^a Concept Courses include PLPA 5303, Host Pathogen Genetics/Physiology and PLPA 5313, Ecology and Epidemiology.

^b Proposal, topic and exit seminars.

^c Discipline Courses include Plant Pathogenic Fungi, Plant Nematology, Plant Virology, and Plant Bacteriology.

^d Electives may include any graduate level course in subject matter related to MS program completion.

GUIDELINES FOR THE DOCTOR OF PHILOSOPHY IN PLANT SCIENCE

Graduate School Admission Policy

The Plant Science Ph.D. Program is jointly offered by the Departments of Horticulture and Plant Pathology. The Plant Science Ph.D. Steering Committee composed of three Category I graduate faculty members from each department will serve as the admissions committee and as a coordinating body for the program. Applicants are given equal consideration without regard to race, color, sex, creed, sexual preference, or national origin.

Graduate Advisory Committee

The Graduate Advisory Committee must include at least five members of the graduate faculty. The committee will include the Faculty Advisor from the student's department of emphasis, one other faculty member from the department of emphasis, one faculty member from the other department participating in the Plant Science program, and two other members, at least one of which is a faculty member from outside the Plant Science Program. This committee shall be chosen by the major professor and the candidate and approved by the Dean of the Graduate School. The department heads are ex-officio members of each Graduate Advisory Committee in their department.

The major professor will, at the earliest opportunity, call a meeting of the student and committee. The student should present a tentative outline of the course work and a research proposal on the objectives and procedures involved in the dissertation. The committee along with the student will establish a definite plan of study and research at this time or, if necessary, in a second such meeting. It is expected that this will be completed in the first semester of a graduate student's program.

An outline of the student's plan of study will be completed by the student and major professor, and copies should be forwarded to the Head of the Plant Pathology Department, program director, and members of the graduate committee for their files.

Academic requirements

General course requirements for each degree candidate will be arranged on an individual basis by the Faculty Advisor, the Advisory Committee and the candidate. A list of courses should be approved by the Graduate Advisory Committee. Alternate courses may be selected, at the discretion of the committee, in the event that any of those selected are not offered.

Course requirements and recommendations

The following course requirements must include at least 3 graduate course credits in each participating department and at least 6 graduate course credits outside these departments, appropriate to the area of dissertation research, and a minimum of 18 hours of dissertation credit. If a student has not taken an introductory course in plant pathology prior to being accepted in the program, the student must take PLPA 502V Special Problems – Plant pathology principles for two credits or make other provisions to satisfy this deficiency

The student is required to take two semesters of Plant Science Colloquium, one directed by a member of each participating department.

<u>Credits</u>	<u>Course Title</u>
(2)	Colloquium ^a
(3)	Horticulture: a Plant Science requirement ^b
(4)	Seminar ^c
(6)	Electives (Graduate Courses)
(18)	Dissertation

All candidates in the Doctoral Program in Plant Science in the Department of Plant Pathology are also required to complete the following courses or must demonstrate previous equivalent course work (credit hours):

<u>Credits</u>	<u>Course Title</u>
(6)	Plant Pathology Concept courses ^d
(3)	Plant Disease Control or Plant Disease Management
(4)	Diseases of Economic Crops
(9)	Discipline Courses ^e

The student should have course work in plant taxonomy, physiology and anatomy, genetics, chemistry through biochemistry, and statistics.

Students in the Plant Science Program specializing in Plant Pathology are expected to be well-versed in areas relevant to the discipline and should have course work in mycology, plant virology, nematology, bacteriology and molecular biology.

- a) Plant Science requirements include two credits in colloquium, one directed by faculty from the Department of Horticulture and one directed by faculty from the Department of Plant Pathology.
- b) Any course offered by Horticulture at the graduate level may fulfill this requirement.
- c) Seminars must include a dissertation proposal seminar, two topic seminars and an exit seminar. CSES 5103 Scientific Presentations may be substituted for one topic seminar.
- d) Concept courses are PLPA 5303, Host Pathogen Genetics/Physiology and PLPA 5313, Ecology/Epidemiology.
- e) Discipline courses include Plant Pathogenic Fungi, Plant Nematology, Plant Virology and Plant Bacteriology.

Teaching Requirements

Students in the Plant Science Ph.D. program will be expected to gain teaching experience by assisting in the teaching of a plant pathology course for one semester. Students with teaching experience can appeal to the Graduate Admissions Committee to waive this requirement.

Candidacy Examinations

Students must satisfactorily pass written and oral candidacy examinations covering his/her discipline and supporting areas. **The exam must be taken approximately 2 years after starting the Ph.D. program and no later than one year before completion of the degree program.** A candidacy exam is intended to assess the candidates suitability either in knowledge or critical thinking to be considered for a Doctoral Degree. As such the preparedness of the candidate will be determined over no more than two examination dates.

Dissertation topic

Each candidate must complete a doctoral dissertation on some topic in the major field. The topic selection shall be made and a title filed with the Dean of the Graduate School at least one year before the final examination. The specific problem and subject of the dissertation will be determined by the faculty advisor, the candidate, and the Graduate Advisory Committee. It is expected that this will be completed in the first semester of a graduate student's program.

Cell and Molecular Biology Program Description

For full details see [Graduate Degree Requirements](#) and the [Cell and Molecular Biology Program description](#) in the Graduate Catalog of Studies

Areas of Concentration

The Cell and Molecular Biology (CEMB) program is an inter-disciplinary program incorporating faculty from 15 departments and four colleges in the University of Arkansas system. The program includes Doctoral and Masters graduate studies in any area of Cell and/or Molecular Biology, including the study of:

- Cell function, structure, metabolism
- Chemical functions on, within and between cells
- Biomolecular reactions and observed cellular properties
- Molecular genetics
- Protein chemistry
- Biological structures and Bio-nanomaterials
- Molecular detection methods to detect or characterize biological states in animal and plant sciences
- Systematics, and phylogenomics
- Chemical or biological forensics
- Biomedicine and Health care.

Admission to Degree Program

- Applicants must present
 - B.A. or B.S. in a basic or applied science
 - Graduate Record Examination scores.
 - CEMB will do conditional admissions for applicants that meet all criteria except for English language proficiency.
 - Three letters of reference
 - All undergraduate and graduate school transcripts
 - The CEMB Applicant Profile
 - To be admitted:
 - Have a sponsoring faculty member
 - Defines research subject
 - Arranges stipend support
- Applicants must contact faculty to find a sponsor
- Research rotations allowed in up to three designated research laboratories during first semester. Contingent upon:
 - Stipend support has been guaranteed
 - Faculty for the rotation have agreed to host the student during this period.
 - Student must obtain a faculty research sponsor after first semester.
 - Evaluation for admission:

- Apply to the Graduate School (CEMB is in the graduate school)
- Applicants must pay all application fees.
- Sponsoring faculty member contacts program director
- Admission approved by Program Advisory Committee

Graduate Student Support

- Support - Graduate Teaching Assistant or Graduate Research Assistant – is arranged within the department of the sponsoring faculty member
 - CEMB faculty can apply for assistantships from the CEMB program.
 - Tuition is paid for all students on an assistantship

Degree Requirements (MS or PhD)

- Must complete CHEM 5813 and CHEM 5843, or their equivalent.
- All students considered full-time must enroll every fall and spring semester in any one of the CEMB approved seminar course.
- An additional 18 hours of graduate credits from CEMB approved courses
 - Excludes seminar, CHEM 5813/5843, dissertation and thesis credit hours.
 - Up to 6 hours may be substituted from other graduate courses with approval from the student's Graduate Advising Committee.
 - Grade Requirement
 - Students must maintain a minimum graduate Grade Point Average of 3.0 on all graduate course work.
 - Any student receiving more than two C grades (regardless of GPA) in graduate courses of 2 hours credit or more may not complete a Ph.D. in the program, but may elect to pursue the M.S. degree.
 - Any student who receives a grade of D or F in any graduate-level course will be subject to dismissal following review by the Program Advisory Committee.

Graduate Advising Committee

- Minimum of 4 CEMB faculty for Ph.D. or 3 for M.S. candidates.
- Must contain CEMB faculty representing a minimum of two different academic departments, and if possible two different colleges.
- This committee:
 - Formulates the student's program of study
 - Administers any required candidacy exams
 - Reviews annual written progress reports

Graduate Thesis/Dissertation Committee

- Minimum of 4 CEMB faculty for Ph.D. or 3 for M.S. candidates.

- Must contain CEMB faculty representing a minimum of two different academic departments, and if possible two different colleges.
- This committee administers the thesis/dissertation examination and student defense.

Requirements for the Master of Science Degree

- Coursework as described above
- Graduate School requires 30 semester hours, a comprehensive examination, a cumulative GPA of 2.85, and a minimum residence of 30 weeks.
- A thesis based on their research
- Give a public presentation of their thesis work prior to the final defense.
- Pass a comprehensive oral examination based on the thesis.

Requirements for the Doctor of Philosophy Degree

- Coursework as described above
- 18 hours of dissertation research.
- Complete the Candidacy Examination
 - Writing of an original research proposal
 - According to federally funded post-doctoral fellowship (e.g., NIH, NSF, USDA)
 - In collaboration with their Graduate Advising Committee, student selects a topic and format for their research proposal within the first year in program.
 - Proposal topic is within the field of Cell and Molecular Biology but on a subject distinct from the students Ph.D. research.
 - Written proposal is submitted to the student's Graduate Advising Committee for evaluation and approval or rejection.
 - Students may submit the proposal more than once.
 - Pass an oral examination over the proposal, related subjects, and general knowledge.
 - Written and oral portions of the candidacy examination must be completed within the Ph.D. candidate's first 29 months in this program.
 - Only upon satisfactory completion of the proposal and oral examination, as judged by the student's Graduate Advising Committee, does a student become a candidate for the Ph.D.
 - Students that fail to complete the candidacy examination in the allotted time will be dropped from the Ph.D. program but may choose to become candidates for the M.S.
- The Ph.D. is granted not only for fulfillment of technical requirements but also for development and possession of critical and creative thought abilities in the areas of Cell and/or Molecular Biology.
- Evidence of these abilities is given through the completion of a dissertation.
- Prior to the Final Examination the Ph.D. candidate will present a public seminar.

PLANT PATHOLOGY SEMINAR AND OTHER REQUIREMENTS

Plant Pathology Seminar

Students enrolled in the Plant Pathology or Plant Science program must enroll in PLPA 5001 for Seminar credit. Three types of student seminars currently exist within the seminar program; research proposal, topic and an exit seminar. The research proposal seminar describes the work being proposed as thesis or dissertation research by each student. The topic seminars provide students the experience of presenting information on varied, current topics of interest in plant pathology. The exit seminar presents the results of research conducted by the student for partial fulfillment of his degree requirements. ***All students are expected to attend seminar regardless of whether they are registered for the class or not.***

A seminar presentation to another department may satisfy part of this requirement if approved by the student's Graduate Advisory Committee and the departmental Graduate Committee.

Annual Progress Review Policy

It is the policy of the Graduate School that annual graduate student reviews are conducted by each Degree Program and the Department of Plant Pathology supports that policy as applied to its MS and PhD programs. The policy requires the submission of an annual progress report describing the academic and research progress made during the past year. The report lists courses taken and the grade received, completion of required examinations toward the advanced degree, a short synopsis of the thesis research progress and a list of professional activities during the year. The report must be submitted to the members of the Advisory Committee, Department Head, and program director no later than May 31 of each year.

The report will be reviewed by the Department Head and program director and a meeting will be held with each student in the Department. An Annual Graduate Student Academic Review Form will then be signed by each student and the Department Head for a Plant Pathology MS or the Program Director for the Plant Science PhD or Cell and Molecular Biology and forwarded to the Graduate School no later than June 15 of each year.

Failure to provide documentation or failing to meet with the advisory committee will be interpreted as lack of progress toward completion of a degree and **may** result in termination of an assistantship appointment for the following year.

Change of Objectives, Status, or Termination of Admission

Students who wish to alter specific objectives as set forth for their admission, registration,

or assistantship status must, along with their advisor, process whatever actions or papers are needed for that change. These changes may include modifications in status such as conditional admission to regular admission, degree status to non-degree status, a research assistantship to a graduate assistantship; simple changes in registration from audit to credit or dropping and adding a course; or numerous other changes in status. Any such modification in your status must be recorded in the Graduate School office, with the program director and the Departmental office, not just with your advisor. Be certain that the process of change is complete and recorded before you operate under a new status.

Graduate student status will be terminated on failure to maintain academic standards required by the Graduate School and the Department. Termination may also result when a student fails to fulfill obligations within the time frame established by the Graduate School and the Department. Graduate status may be terminated before expiration of specified time under circumstances of academic dishonesty, incompetence, inefficiency, or neglect of duties; job-related misconduct; moral turpitude; financial exigency; or other unforeseen circumstances that severely deter or halt progress in the student's program.

Successfully defending the student's thesis or dissertation is one of the final degree requirements. The defense should not be scheduled until the student and their advisor are confident that the student's level of accomplishments and performance will receive a favorable vote from the committee. An unsatisfactory vote indicates that the student has failed their degree program.

Professionalism

One way to show interest in the profession of Plant Pathology is to participate in the professional societies affiliated with Plant Pathology or related scientific societies. Many of the societies are interested in having students as members so there are special rates for students. The American Phytopathological Society is one such organization for Plant Pathology. Students are expected to attend annual meetings of the different societies and participate by presenting papers and posters at these annual meetings.

Graduate Student Association

The graduate students in Plant Pathology have formed a graduate student organization that is a University Registered Student Organization (RSO). Through this organization graduate students can request funds for invited speakers and a number of civic or social activities. This is an opportunity to develop civically and professionally.

UNIVERSITY SERVICES AND PROGRAMS

The Credit Union

If you hold an assistantship, you are an employee of the University of Arkansas, and as such, you are eligible for membership in the UARK Federal Credit Union. You can obtain further information from the UARK Federal Credit Union, 50 W Van Asche, Fayetteville, AR 72703.

For more information: <https://uarkfcu.com/>

Housing

Most graduate students have acquired housing off campus in Fayetteville. Further information can be obtained from the Director, Housing Office, 9th Floor Hotz Hall, University of Arkansas, Fayetteville AR 72701.

For More information: <http://housing.uark.edu/>

Transportation

During the spring and fall semesters, a transit system of University buses circuits a wide area of the city. Route maps and schedules can be obtained at the transit office.

For more information: <https://parking.uark.edu/>

Parking

Parking for private vehicles is limited both on the campus and near the campus. A parking permit may be obtained from the Parking Office.

For more information: <https://parking.uark.edu/>

Use of University Vehicles

State vehicles are operated by the Department of Plant Pathology for official business only. To qualify as a driver for state vehicles you must possess a current and valid Arkansas driver's license.

University of Arkansas Vehicle Safety Policy

Operators of University of Arkansas vehicles, rental vehicles, personal vehicles, or any vehicle for University business purposes must have a valid driver's license to operate the type of vehicle being driven.

Employees who regularly operate vehicles as a condition of employment must complete an [Authorization to Operate form](#), which is a release to permit the University to check an employee's driving record initially and on a continuous basis via the Arkansas State

Vehicle Safety System Information Network. Driving records for non-resident drivers will be obtained by sending the form to the Department of Finance and Administration, Office of Driver Services . Applicants being considered for employment to positions requiring operation of vehicles for University business purposes on a regular basis must also complete this form. Examples of regular operators would be those positions with duties which include driving a vehicle on a daily or weekly basis; and positions that require travel regularly as an essential part of their employment, i.e., recruiters, etc.

Driving records will be evaluated according to the point system established by the Arkansas State Office of Driver Services. Drivers who accumulate 10 points or more according to the [Office of Driver Services Chart](#) will be subject to administrative action and possible driving restrictions as described under "[Procedures](#)". Please note that there is a 3-year look back period for driving record violations. The total points assigned to each violation will be used in determining when administrative action is required. Risk Management will notify departments each time a driver receives a violation which results in 10 or more accumulated points and/or when a driver's license has been suspended, revoked, or restricted.

For more information, see: <http://risk.uark.edu/vehicle-safety-policy.php>

Office Policy

The staff is here to assist you with your needs related to your employment and research. Office needs related to your coursework or personal needs are the student's responsibility. The office staff in the Department of Plant Pathology do not prepare theses and dissertations. Students are responsible for making all copies of their thesis or dissertation.

Computers and printers are available for use by graduate students at various computer labs located on campus and in the Department.

Communications

You will be assigned a mailbox in the Departmental mail room in the Plant Science Building. Personal letters or packages should not be mailed *with or without* postage nor should personal mail be received using the University mailing services.

Use of Faxes, Telephones and Cell Phones

You will have access to a telephone in or near your office and laboratory. Please limit personal use of the phones for local calls to keep lines available for business and professional calls. Long-distance personal calls are strictly prohibited. Faxes can be sent and received in the Department of Plant Pathology for official business only.

Appendix 1

Assessment plan for the Master's in Plant Pathology

Goals

1. Enhance the regional and national reputation of the program by completing Master's students who make substantial contributions to the sciences in industry, university and government jobs.
2. Educate students to conduct research that advances evolving fields of science and prepares them for rewarding careers in the sciences.
3. Students will make significant impacts in society by generating knowledge to improve agricultural practices that guarantee food security, promote environmental sustainability and profitability of Arkansas farmers.

Outcomes

Students will have the ability to prepare and deliver an oral presentation that is appropriate for a range of audiences and conveys a clear, relevant, scientifically-sound and memorable message.

Students will have the ability to write for a range of audiences in a clear, scientific and concise synthesis of information conveying results, implications and contributions to field of study.

Students will have the ability to identify a problem, develop hypotheses, apply and modify existing research methodologies, and critically evaluate one's own findings and those of others while adhering strictly to ethical principles.

Timeline from assessment and analysis. Rubrics will be used twice to assess student progress. The first assessment will be before the completion of the first year in their initial advisory committee meeting for their research proposal. Satisfactory levels will lead to course and proposal approval. Levels below the benchmark, will determine additional courses and additional assessment. The second assessment will be at the students' defense. The major advisor and all advisory committee members will complete all the rubrics as part of assessing the student's progress. The rubrics will be collected by the major advisory and provided to the Department Head and Graduate Coordinator.

Means of assessment

A mean rubric score for each rubric must be 2 for the research proposal and 2.7 for the defense to receive a passing decision.

Reporting of results

Evaluating the students while they are taking courses and crafting their proposal will be used to determine what skills and knowledge should be enhanced by courses and additional mentoring for individual students. Comparing common deficiencies among students will highlight areas requiring continued improvement for the program and student mentoring process. Results will be reported as ranges and means of student performance annually and progress will be examined using three year rolling averages.

ORAL COMMUNICATION VALUE RUBRIC

Adapted from AACU on oral communication

Definition

Oral communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Evaluators are encouraged to assign a one to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	Milestones 3	Benchmark 2
Organization Scientific presentations should include all of the following sections: introduction with hypotheses and objectives, methods, results and conclusion.	The presentation includes all the sections and the contents of each section are seamlessly integrated. Each section is clear and concise. The final conclusions are fully supported. Overall, the presentation is memorable.	The presentation includes all the sections and the contents of each section are consistently integrated. Most of the final conclusions are supported. The presentation is very informative.	The presentation includes all the sections and the integration of all the sections is apparent. Some sections are not thoroughly explained. Some conclusions are supported. The presentation is understandable.
Language and use of technical vocabulary	Uses appropriate and precise professional language and, language that is appropriate to the audience.	Mostly uses appropriate and precise professional language and, language that is appropriate to the audience.	Generally uses appropriate and precise professional language, but may not always be appropriate to audience.

<p>Delivery Clearly points to pertinent aspects</p>	<p>Demonstrates confidence and knowledge. Engages the audience by skillfully keeping eye contact with the audience while making use of the supporting material and appropriate use of technology. Body language appropriately used to enhance value of presentation.</p>	<p>Appears comfortable with the topic and, consistently engages the audience. Makes appropriate use of the supporting material. Body language tentative.</p>	<p>Does not always appear comfortable with the topic or able to engage the audience. Uses supporting materials inconsistently... Limited eye contact with audience. Some distracting mannerisms.</p>
<p>Supporting Material Presented and shows clear understanding</p>	<p>Supporting materials are attractive, carefully designed and with clear purpose that elegantly supports the message. They do not repeat the oral content. Proper credit to references given.</p>	<p>Supporting materials are well designed and properly used to convey message. Proper credit to references given.</p>	<p>Supporting materials are adequately prepared and help conveying the message. Proper credit to references given in most cases.</p>
<p>Central Message effort</p>	<p>Central message is strongly supported by all the sections of the presentation. The audience fully understands the relevance and implications of the research.</p>	<p>Central message is clear. The audience understand the basic aspects of the research.</p>	<p>Central message is clear. The audience can deduce the importance of the research.</p>

WRITTEN COMMUNICATION VALUE RUBRIC

Adapted from the written communication rubric from AACU

Definition

Written communication is the development and expression of ideas in writing. Written communication involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

Evaluators are encouraged to assign a one to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	Milestones 3	Benchmark 2
Purpose for Writing	Demonstrates a thorough understanding of audience, intent of writing is clear and focuses all elements of the work.	Demonstrates adequate consideration of audience, intent of writing is clear and focuses most elements of the work.	Demonstrates awareness of audience, intent of writing can be inferred by the audience and focuses some elements of the work.
Content	Contains the necessary amount of information carefully summarized to convey a clear and informative message to the audience	Contains the necessary information conveying a general message to the audience.	Contains relevant information but not well- focused to accurately convey the message to the audience.
Genre and Disciplinary Conventions	Understands scientific conventions of writing and, skillfully uses appropriate scientific terms. Demonstrates excellent understanding of technical language.	Understands scientific conventions of writing and consistently uses relevant scientific language.	Uses some scientific conventions and is aware of relevant scientific language.

<p>Sources: include published literature</p>	<p>Comprehensively uses published references that are critically analyzed and presented in the appropriate context. Background information is clear and carefully summarized given proper credit to authors in publications. Meticulously uses own words and style avoiding any possible plagiarism.</p>	<p>Comprehensibly uses publishes references that are assumed to be of high quality. Background information is well summarized given proper credit to authors in publications. Uses own words frequently.</p>	<p>Uses most references that provide relevant information. Avoids plagiarism.</p>
<p>Results: includes data from research and in the form of figures, tables, images.</p>	<p>Logically presents high quality data that is comprehensive, informative, cohesive and skillfully integrated. Appropriate data is properly analyzed and adheres to scientific standards.</p>	<p>Presents high quality data that is well integrated. Data is well presented and properly analyzed.</p>	<p>Presents sufficient data and properly analyzed. Presentation is adequate.</p>
<p>Discussion</p>	<p>Demonstrates comprehensive knowledge of the topic by carefully integrating published information with results from own research. Conveys a strong message that is fully supported by results.</p>	<p>Demonstrates broad knowledge and is capable of integrating published information with results from own research. Conveys a general message about research</p>	<p>Demonstrates relevant knowledge and relevance of the research is apparent. Integration of literature and own work adequate. General message lacks depth.</p>

PROBLEM SOLVING AND CRITICAL THINKING RUBRIC

ADAPTED FROM AACU RUBRICS ON PROBLEM SOLVING, INQUIRY AND ANALYSIS AND CREATIVE THINKING

Definition

The systematic process of exploring issues, objects or works through the collection and analysis of evidence that results in a clear statement of the problem leading to the development of hypotheses and objectives, effective and reasonable experimental approaches, insightful analysis of data and an informed interpretation of the resulting conclusions or judgments.

Evaluators are encouraged to assign a one to any work sample or collection of work that does not meet benchmark (cell one) level performance.

	Capstone 4	Milestones 3	Benchmark 2
Define Problem Reflects an understanding of the context in terms of current knowledge	Demonstrates the ability to construct a clear and insightful problem statement with evidence of all relevant literature and observations.	Demonstrates the ability to construct a clear problem statement with evidence of most relevant literature and observations.	Demonstrate adequate ability to construct a problem statement with evidence of most relevant literature and observations, but problem statement is superficial.
Hypotheses	Proposes one or more hypotheses that indicates a deep comprehension of the problem. Hypotheses address all of the relevant literature and observations, and relations between hypotheses are strong.	Proposes one or more hypotheses that indicates comprehension of the problem. Hypotheses address most of the relevant literature and observations, but relations between hypotheses are weak	Proposes one hypothesis that is superficial rather than designed to address the relevant literature and observations of the problem.

Experimental Approach	Clear objectives are proposed for each hypothesis. Appropriate methodology are adopted from across disciplines. All necessary treatments and controls are included. Analysis is appropriate and well thought out. All experiments are feasible in terms of time, effort, facilities and cost. Schedule of experiments well developed. Likely problems with experiments anticipated and contingencies outlined.	Objectives proposed for each hypothesis mostly clear. Methodology is appropriately developed, however, more subtle aspects are ignored. Most necessary treatments and controls are included. Analysis is appropriate, but needs more detail. Most experiments are feasible in terms of time, effort, facilities and cost. Schedule of experiments mostly developed. Some problems with experiments anticipated.	Objectives proposed for hypothesis mostly clear. Elements of the methodology are poorly developed, or unfocused. Most necessary treatments and controls are included. Analysis vague. Problems with experiments not anticipated.
Interpretation of Results, Limitations, and Implications	Clear understanding of how results relate to the hypothesis, the other hypotheses and to the stated problem. Insightfully discusses in detail relevant and supported limitations and implications of the research. Demonstrates a clear understanding of future research direction.	Has an understanding of how results relate to individual hypothesis and to the stated problem, but not necessarily to the other hypotheses. Discusses relevant and supported limitations and implications of the research. Demonstrates some understanding of future research direction.	Has a superficial understanding of how results relate to individual hypotheses and to the stated problem. Presents relevant and supported limitations and implications. Can suggest possible future research direction.