Twin Cities Campus

Plant Pathology M.S.

Plant Pathology

College of Food, Agricultural and Natural Resource Sciences

Link to a list of faculty for this program.

Contact Information:
Department of Plant Pathology, 495 Borlaug Hall, 1991 Buford Circle, Saint Paul, MN 55108 (612-625-8200)
Email: plpath@umn.edu
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- Program Type: Master's
- Requirements for this program are current for Spring 2021
- Length of program in credits: 31
- This program requires summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

Plant pathology focuses on the biology of plant-microbe interactions, and incorporates research involving biochemical, molecular, genetic, physiological, whole organism, population, and community levels of biological organization. Plant pathology interfaces with all plant science disciplines, and with food sciences, veterinary medicine, biobased products, and ecology. The MS program offers a molecular plant pathology track, in which students can design and use molecular approaches to investigate plant disease, increase basic knowledge, and develop new strategies for disease control.

The following areas of concentration are also offered: plant disease management, biological control of plant disease, forest pathology and microbial degradation of wood, microbial ecology, population biology, plant-microbe interactions, disease resistance, host-parasite coevolution, plant microbe mutualisms, and virology. Students have opportunities for laboratory and field research locally as well as nationally and internationally.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.50.

Applicants must have a sound college background in the basic biological and physical sciences and mathematics.

Other requirements to be completed before admission:
Applicants must have completed 35 semester credits in biology with at least one course in each of the following areas: botany, zoology, genetics, plant physiology, and microbiology. Applicants must also have completed at least one course each in inorganic chemistry, organic chemistry, biochemistry, and physics. If deficiencies exist in the prerequisites, students must correct them during the first year of the graduate program. These courses cannot be counted as part of the degree program.

Special Application Requirements:
GRE scores are required for all students and TOEFL or IELTS scores are required for international students. A clearly written statement of career interests as well as three letters of recommendation are required of all students. Students may apply at any time; however, submission of all application materials by December 1 will ensure priority consideration for fellowships and research assistantships for the next academic year. Students can be admitted any semester.

Applicants must submit their test score(s) from the following:

- GRE
  - General Test - Verbal Reasoning: 153
  - General Test - Quantitative Reasoning: 148
  - General Test - Analytical Writing: 4.5

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79

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- Internet Based - Writing Score: 21
- Internet Based - Reading Score: 19

• IELTS
- Total Score: 6.5

Key to test abbreviations(GRE, TOEFL, IELTS).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan A: Plan A requires 15 major credits, 6 credits outside the major, and 10 thesis credits.The final exam is oral.

Plan B: Plan B requires 25 major credits and 6 credits outside the major.The final exam is oral. A capstone project is required.
Capstone Project: The capstone project usually involves a smaller research project than the Plan A thesis, extension/teaching related product, or a comprehensive literature review of plant pathology related subject. The project subject, scope, and the specific format of the expected final product must be agreed upon by the student's committee.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 2.80 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Total credits required is 31.5 credits.
Plan A students must complete 15.5 credits of PLPA coursework.
Plan B students must complete 25.5 credits of PLPA coursework.
Students must enroll in a credit or non-credit teaching methods seminar or workshop, chosen in consultation with the advisor and director of graduate studies.
Regular attendance at weekly plant pathology seminars is expected.
Internships are encouraged as part of the graduate experience. Financial support for international or domestic internships is available on a competitive basis.
Take PLPA 5480 (3 credits), if an introductory plant pathology course has not previously been taken.

Required Coursework (6.5 credits)
Take the following courses. Take PLPA 8005 for 2 credits to fulfill the one-semester teaching experience. Consult with the advisor and director of graduate studies regarding the additional teaching methods seminar/workshop requirement.
PLPA 5480 - Principles of Plant Pathology (3.0 cr)
PLPA 8123 - Research Ethics in Plant and Environmental Sciences (0.5 cr)
PLPA 8200 - Plant Pathology Seminar (1.0 cr)
PLPA 8005 - Supervised Classroom or Extension Teaching Experience (1.0 - 2.0 cr)
Non-Molecular Required Courses (4 credits)
Complete the following:
PLPA 8104 - Plant Virology (2.0 cr)
PLPA 8105 - Plant Bacteriology (3.0 cr)
Plant Pathology Electives (5 to 12 credits)
Plan A students select 5 credits, and Plan B students select 5 to 12 credits from the following. All courses must be chosen in consultation with the advisor, graduate advisory committee, and director of graduate studies.

PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
PLPA 5202 - Field Plant Pathology (2.0 cr)
PLPA 5203 - Introduction to Fungal Biology (3.0 cr)
PLPA 5300 - Current Topics in Molecular Plant Pathology (1.0 cr)
PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)
PLPA 5303 - Data Visualization in Plant and Microbial Biology (3.0 cr)
PLPA 5444 - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)
PLPA 8103 - Plant-Microbe Interactions (3.0 cr)
Outside Coursework (6 credits)
Select 6 credits, from the following or other coursework, in consultation with the advisor, director of graduate studies, and advisory

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committee.
AGRO 5121 - Applied Experimental Design (4.0 cr)
AGRO 5431 - Applied Plant Genomics and Bioinformatics (3.0 cr)
BIOL 5272 - Applied Biostatistics (4.0 cr)
SOIL 5611 - Soil Biology and Fertility (4.0 cr)
STAT 5021 - Statistical Analysis (4.0 cr)

Plan Options

Plan A
Thesis Credits
Take 10 master's thesis credits.
PLPA 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

-OR-

Plan B
Capstone Project (10 credits)
Take project credits, as needed to complete the 31.5-credit requirement for the degree, in consultation with the advisor and graduate advisory committee.
PLPA 8300 - Plant Pathology Project (1.0 - 6.0 cr)

Program Sub-plans

A sub-plan is not required for this program.
Students may not complete the program with more than one sub-plan.

Molecular Plant Pathology

This sub-plan is limited to students completing the program under Plan A.

Molecular Plant Pathology (21.5 credits)
Required Coursework (10.5 credits)
Take the following courses. Take PLPA 8005 for 2 credits to fulfill the one-semester teaching experience. Consult with the advisor and director of graduate studies regarding the additional teaching methods seminar/workshop requirement.
PLPA 5300 - Current Topics in Molecular Plant Pathology (1.0 cr)
PLPA 5480 - Principles of Plant Pathology (3.0 cr)
PLPA 8005 - Supervised Classroom or Extension Teaching Experience (1.0 - 2.0 cr)
PLPA 8103 - Plant-Microbe Interactions (3.0 cr)
PLPA 8123 - Research Ethics in Plant and Environmental Sciences (0.5 cr)
PLPA 8200 - Plant Pathology Seminar (1.0 cr)
Select courses from the following, or other electives as needed to complete minimum credit requirements. All courses must be chosen in consultation with the director of graduate studies, advisor, and graduate advisory committee.
PLPA 5003 - Diseases of Forest and Shade Trees (3.0 cr)
PLPA 5202 - Field Plant Pathology (2.0 cr)
PLPA 5203 - Introduction to Fungal Biology (3.0 cr)
PLPA 5301 - Large Scale Omic Data in Plant Biology (3.0 cr)
PLPA 5303 - Data Visualization in Plant and Microbial Biology (3.0 cr)
PLPA 5444 - Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions (3.0 cr)
PLPA 5660 - Plant Disease Resistance and Applications (3.0 cr)
PLPA 8104 - Plant Virology (2.0 cr)
PLPA 8105 - Plant Bacteriology (3.0 cr)
Outside Coursework Molecular PLPA (6 credits)
Select at least 6 course credits outside the major in consultation with advisor, director of graduate studies, and advisory committee.
AGRO 5121 - Applied Experimental Design (4.0 cr)
AGRO 5431 - Applied Plant Genomics and Bioinformatics (3.0 cr)
BIOL 5272 - Applied Biostatistics (4.0 cr)
SOIL 5611 - Soil Biology and Fertility (4.0 cr)
STAT 5021 - Statistical Analysis (4.0 cr)

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