

# Horticulture (HORT)

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## Degree Conferred:

M.S. in Horticulture (HORTMS)  
 Ph.D. in Agricultural, Food and Life Sciences with concentration in Horticulture (AFLSPH-HORT)

The Department of Horticulture offers a thesis and non-thesis option for the M.S. degree. The non-thesis program was developed for continued and advanced education in horticulture management. The program is directed toward students entering careers in horticulture upon completion of the degree, or students requiring additional education for advancement in their careers.

Related doctoral programs are offered by the Dale Bumpers College of Agricultural, Food and Life Sciences, which offers a Ph.D. degree with a concentration in Horticulture, and by the Department of Plant Science, which offers a Ph.D. in plant science with concentrations available in horticulture or plant pathology.

Genetics and plant breeding of fruit, vegetable, or ornamental crops; physiology, management and production of fruit, vegetable, greenhouse, or ornamental crops and landscape plantings; physiology and management of turfgrasses; and biotechnology.

## M.S. in Horticulture

### Prerequisites to Master of Science Degree Program (Thesis Option):

A candidate must have a B.S. degree from an accredited institution with a background in physical and biological sciences, horticulture, and supporting agricultural disciplines. The student will work with a major adviser, who will arrange a committee to evaluate the student's background and plan a program of study with the student.

**Requirements for the Master of Science Degree (Thesis Option):** A minimum of 24 semester hours of graduate level course work and 6 hours of thesis are required, in addition to any deficiency courses that may be specified. The student's advisory committee will also serve as the thesis and oral examination committee.

Students should also be aware of Graduate School requirements with regard to master's degrees (<http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext>).

### Prerequisites to Master of Science Degree Program (Non-thesis Option):

Students seeking to pursue the non-thesis option must meet all admission criteria for the UA Graduate School. Applicants should have completed a B.S. or B.A. degree and have had course work in plant sciences, biology, botany, horticulture, or three years of experience in a plant science related career. Additionally, students seeking admission into the M.S. non-thesis option must submit three letters of reference

regarding academic and professional experiences and potential. No professional examinations are required for admission.

### Requirements for the Master of Science Degree (Non-thesis

**Option):** A minimum of 30 hours of graduate course work as approved by the student's academic advising committee and within the requirements prescribed below. Specific Degree Requirements follow:

HORT 503V	Special Problems Research	1-6
HORT 5001	Seminar	1
Nine hours of HORT courses		9
BIOL 4303		3
AGST 5023	Principles of Experimentation	3
	or AGST 5014 Experimental Design	

1. Horticulture Block – A minimum of 20-21 hours including:
2. Plant and Agricultural Science Block – A minimum of 8-9 hours including: Course work in BIOL, CSES, AGST, PLPA, PTSC, ENTO, AGECE, AGME, AGED, LARC, or HORT.
3. Students must pass a written and oral examination to be given by their advising committee upon completion of their course work and submission of special project.

Students should also be aware of Graduate School requirements with regard to master's degrees (<http://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext>).

The Ph.D. program in plant science is an interdepartmental program involving the Departments of Horticulture and Plant Pathology. The dissertation and most of the course work may be completed in horticulture.

## Requirements for Ph.D. in AFLS with Horticulture Concentration

**Prerequisites to Degree Program:** A Master of Science degree is desirable. A student with a Bachelor of Science and an exceptional record in academics and/or research may be approved for admission to the Ph.D. program in Agricultural, Food and Life Sciences if the Graduate Student Concentration Admissions Committee of the desired concentration deems them qualified and approval is granted by the AFLSPH Steering Committee. A student admitted to the University of Arkansas, pursuing an M.S. and in good academic standing may apply to be admitted to the doctoral program and forgo completing the M.S. degree if so approved by the AFLSPH Steering Committee and the AFLSPH Graduate Concentration Admissions Committee. A minimum grade point average of 3.00 (on a 4.00 scale) on previous college-level course work is required.

**Admission Requirements for Entry:** To be considered for admission, a student must submit a letter of intent, along with the application for admission indicating the desired degree concentration, areas of interest and career goals. Official transcripts of all previous college-level course work must be submitted. Three letters of recommendation are required. These letters should address the character and academic capability of the applicant. Applications will first be reviewed by the AFLSPH Steering Committee which will assign the student to the appropriate Graduate Student Concentration Admissions Committee for review. The Concentration Admissions Committee will make the final determination of admittance into the AFLSPH program and the concentration.

**Requirements for Doctor of Philosophy Degree:** The Ph.D. program in Agricultural, Food and Life Sciences requires a minimum of 72 credit

hours after a Bachelor of Science or Bachelor of Arts degree or a minimum of 42 hours after a Master of Science or Master of Arts degree.

General course requirements for each degree candidate are arranged on an individual basis by the Faculty Adviser, the Graduate Advisory Committee and the candidate in accordance with guidelines of their concentration. Alternate courses may be selected at the discretion of the committee.

All students must complete 6 hours of elective course hours and 2 hours of seminar. One seminar must be a research proposal presentation and the other must be an exit seminar presenting the dissertation research results. All students must complete 18 hours of doctoral dissertation hours. Students entering the doctoral program with only a B.S. or B.A. must also complete an additional 30 hours (to reach the 72 hour post B.S./B.A. requirement). Students must satisfactorily pass written and oral candidacy examinations covering their discipline and supporting areas. These examinations must be completed at least one year before completion of the Ph.D. degree program in Agricultural, Food and Life Sciences. Each candidate must complete a doctoral dissertation on an important research topic in the concentration field. The specific problem and subject of the dissertation is determined by the faculty adviser, the student and the Graduate Advisory Committee. A dissertation title must be submitted to the dean of the Graduate School at least one year before the dissertation defense. Provisional approval of the dissertation must be given by all members of the Graduate Advisory Committee prior to the dissertation defense. Students must pass the oral defense and examination of the dissertation given by the Graduate Advisory Committee. A student cannot be approved for conferral of the doctoral degree until after completion of all coursework, written and oral candidacy exams, the defense passed and dissertation accepted by the Graduate School and an application for the degree has been filed with the Registrar's Office and the fee paid.

In addition to the general requirements for the Ph.D. program in Agricultural, Food and Life Sciences, students in the Horticulture concentration must complete 9 graduate-level credits of HORT courses.

## Graduate Faculty

**Bertucci, Matthew**, Ph.D., M.S. (North Carolina State University), B.S. (Spring Hill College), Assistant Professor, 2020.

**Cato, Aaron J.**, Ph.D. (University of Arkansas), M.S. (Kansas State University), B.S. (Arkansas State University), Assistant Professor, 2019.

**Clark, John R.**, Ph.D. (University of Arkansas), M.S., B.S. (Mississippi State University), Distinguished Professor, 1983, 2016.

**Dickson, Ryan W.**, Ph.D., B.S. (University of Florida), Assistant Professor, 2018.

**Karcher, Douglas Edward**, Ph.D., M.S. (Michigan State University), B.S. (The Ohio State University), Professor, 2000, 2016.

**Mackay, Wayne A.**, Ph.D. (University of Maryland), M.S. (University of Delaware), B.S. (Virginia Polytechnic Institute and State University), Professor, 2014.

**McDonald, Garry Vernon**, Ph.D., M.S., B.S.A. (Texas A&M University), Clinical Assistant Professor, 2016.

**McKern, Jacquelyn A.**, Ph.D., M.S. (University of Arkansas), B.S. (Arkansas Technical University), Associate Professor, 2016.

**McWhirt, Amanda L.**, Ph.D. (North Carolina State University), M.S. (Louisiana State University), B.S. (Tarleton State University), Assistant Professor, 2016.

**Richardson, Mike**, Ph.D. (University of Georgia), M.S. (Louisiana State University), B.S. (Louisiana Tech University), Professor, 1998, 2007.

**Rom, Curt R.**, Ph.D., M.S. (The Ohio State University), B.S. (University of Arkansas), University Professor, 1989, 2014.

**Shi, Ainong**, Ph.D. (North Carolina State University), M.S. (Graduate School of Chinese Academy of Agricultural Sciences), B.S. (Zhejiang University), Assistant Professor, 2013.

**Worthington, Margaret L.**, Ph.D. (North Carolina State University), M.S. (University of California-Davis), B.S. (Duke University), Assistant Professor, 2016.

## Courses

### HORT 5001. Seminar. 1 Hour.

Review of scientific literature and oral reports on current research in horticulture. (Typically offered: Fall and Spring) May be repeated for up to 4 hours of degree credit.

### HORT 501V. Special Topics in Horticulture, Turf or Landscape. 1-6 Hour.

Topics related to horticulture, turfgrass or landscape science or management not covered in other courses or a more intensive study of a specific topic. Graduate degree credit will not be given for both HORT 401V and HORT 501V. (Typically offered: Irregular) May be repeated for degree credit.

### HORT 503V. Special Problems Research. 1-6 Hour.

Original investigations on assigned problems in horticulture. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

### HORT 5043. Advanced Plant Breeding. 3 Hours.

Application of genetic principles to the improvement of crop plants. Presentation of conventional plant breeding methods and special techniques such as polyploidy, interspecific hybridization and induced mutation. Lecture 3 hours per week. Prerequisite: BIOL 2323 and BIOL 2321L or (ANSC 3123 and CSES 4103). (Typically offered: Spring Odd Years)

### HORT 5103. Plant Growth and Development. 3 Hours.

This course will focus on environmental and developmental processes of plant growth and development. A student completing this course should have an understanding of the developmental processes of plant growth and how environmental factors interact to affect and control plant growth and development. (Typically offered: Fall)

### HORT 5113. Fruit Production Science and Technology. 3 Hours.

The management technologies and cultural practices of fruit crops including (but not limited to) blueberries, blackberries, raspberries, strawberries, grapes, peaches, and apples will be presented. The underlying scientific principles of crop genetics, nutrition, and physiology will be presented as a basis for making management decisions in fruit crop productions. Graduate degree credit will not be given for both HORT 4103 and HORT 5113. Corequisite: Lab component. Prerequisite: HORT 2003. (Typically offered: Spring Odd Years)

### HORT 5143. Professional Landscape Management. 3 Hours.

Principles and practices of landscape management and maintenance. Topics include low maintenance and seasonal color design, pruning and hazard tree management, water and fertilizer management, pesticide use, and other maintenance activities. Basic elements of marketing, specifications and contracts, estimating, personnel management, and equipment selection and acquisition relevant for landscape services will be introduced. Preparatory training in agribusiness or business is suggested. Prerequisite: HORT 2003 and HORT 3103. (Typically offered: Fall Odd Years)

**HORT 5153. Sustainable Techniques in Urban Horticulture. 3 Hours.**

Student will learn basic techniques in sustainable production of horticultural crops in an urban or small-scale environment. Crops may include vegetables, cut flowers, or small fruits. This course is intended for students who do not have an agricultural production background or for those students wanting to learn more about the production of high-value horticultural crops under sustainable production systems. For graduate credit, students will be expected to design a four-year crop rotation scheme using sustainable techniques. The student will also develop a plan addressing issues such as post-harvest handling and or food safety issues. (Typically offered: Summer)

**HORT 5203. Temperature Stress Physiology. 3 Hours.**

This course will teach students how to apply biological, chemical and physical principles to models of how plants are damaged by temperature extremes and how they change to increase resistance. Student will apply these principles to better understand plant responses to other environmental challenges, including both biotic and abiotic stresses. (Typically offered: Spring)

**HORT 530V. Special Problems. 1-6 Hour.**

Original investigations on assigned problems in horticulture. Graduate degree credit will not be given for both HORT 400V and HORT 530V. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

**HORT 5333. Professional Landscape Installation and Construction. 3 Hours.**

Principles and practices involved in landscape installation and construction. Topics covered include sequencing construction activities, protecting existing trees, landscape soils, selecting plants, planting and transplanting plant materials, wood construction, cement and masonry construction, and low-voltage lighting. Lecture 3 hours per week. Preparatory training in agribusiness or business is suggested. Graduate degree credit will not be given for both HORT 4033 and HORT 5333. Prerequisite: HORT 2003. (Typically offered: Fall Even Years)

**HORT 5403. Plant Propagation. 3 Hours.**

Principles of plant propagation using seeds, cuttings, grafting, budding, layering, and tissue culture. The physiological basis of propagation is described. Knowledge of plant growth and physiology is needed. Lecture 2 hours, laboratory 2 hours per week. Graduate degree credit will not be given for both HORT 4403 and HORT 5403. Corequisite: Lab component. Prerequisite: BIOL 1613 and BIOL 1611L. (Typically offered: Spring)

**HORT 5413. Horticulture Physiology. 3 Hours.**

This course provides students with a background into the physiological processes of plants with an emphasis on horticultural crops and how the processes relate to horticultural crop production practices. Among the topics covered are photosynthesis, respiration, water relations and morphogenesis. Graduate degree credit will not be given for both HORT 4413 and HORT 5413. Prerequisite: HORT 2003 and CHEM 1073. (Typically offered: Spring)

**HORT 5503. Sustainable Nursery Production. 3 Hours.**

This course addresses issues and practices involved in production of quality woody nursery crops (e.g. trees and shrubs produced in open field and containerized systems). Graduate degree credit will not be given for both HORT 4503 and HORT 5503. (Typically offered: Spring Even Years)

**HORT 5701L. Greenhouse Management and Controlled Environment Horticulture Laboratory. 1 Hour.**

Laboratory involving hands-on experiments designed to demonstrate principles discussed in the lecture section. Includes field trips. Graduate degree credit will not be given for both HORT 4701L and HORT 5701L. Corequisite: HORT 5703. (Typically offered: Fall Odd Years)

**HORT 5703. Greenhouse Management and Controlled Environment Horticulture. 3 Hours.**

Operation and management of greenhouses and other controlled environments used in horticultural production. Emphasis on system design and construction, control of light intensity and photoperiod, heating and cooling systems, substrates, mineral nutrition, water quality and irrigation systems. Graduate degree credit will not be given for both HORT 4703 and HORT 5703. Prerequisite: HORT 2003 and CHEM 1073. (Typically offered: Fall)

**HORT 5801L. Greenhouse Crops Production Laboratory. 1 Hour.**

Laboratory involving hands-on experiments designed to demonstrate principles discussed in the lecture section. Includes field trips. Corequisite: HORT 5803. (Typically offered: Spring Even Years)

**HORT 5803. Greenhouse Crops Production. 3 Hours.**

Principles and practices of production and marketing of crops commonly grown in controlled environments including flowering containerized herbaceous species, geophytes, annual and perennial bedding plants, hydroponic vegetables and herbs. Prerequisite: HORT 4703 or HORT 5703 (formerly HORT 4703). (Typically offered: Spring Even Years)

**HORT 5993. Global Horticulture and Human Nutrition to Enhance Community Resilience and Food Security. 3 Hours.**

This course covers three broad areas (Global Horticulture, Sustainable International Development, Human Health and Nutrition) and experts on three campuses created the instruction. The course is intended to be multi-disciplinary, and students should use their contextual knowledge to add to weekly discussions. Prerequisite: Graduate standing. (Typically offered: Spring Even Years)  
This course is cross-listed with AGED 5993, FDSC 5993.

**HORT 600V. Master's Thesis. 1-6 Hour.**

Master's Thesis. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

**HORT 602V. Special Topics in Horticulture. 1-3 Hour.**

Discussion and advanced studies on selected topics in genetics, plant breeding, physiology and culture of horticultural crops. Prerequisite: Graduate standing. (Typically offered: Irregular) May be repeated for degree credit.

**HORT 6033. Molecular Plant Breeding. 3 Hours.**

In-depth study of genetic improvement and techniques. Covers both current and classical literature. Topics to be discussed: haploidy, genetic control of pairing, somatic instability, tissue culture and protoplast fusion, and male sterility. Lecture discussion 3 hours per week. Prerequisite: BIOL 2323 and BIOL 2321L (or ANSC 3123 and CSES 4103 or equivalent). (Typically offered: Fall)

**HORT 700V. Doctoral Dissertation. 1-18 Hour.**

Doctoral Dissertation. May be repeated for degree credit. Prerequisite: Graduate Standing. (Typically offered: Fall, Spring and Summer) May be repeated for up to 18 hours of degree credit.