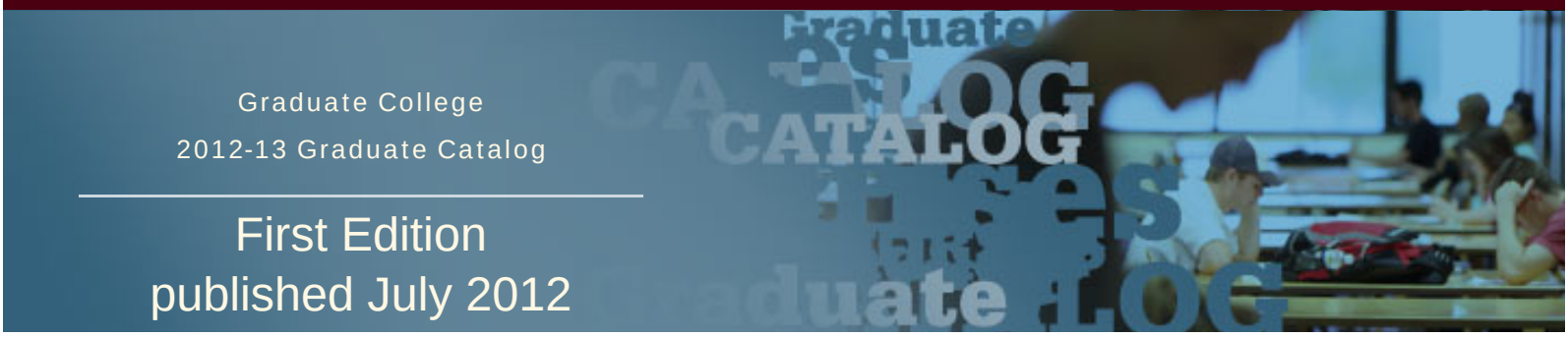

Graduate College

2012-13 Graduate Catalog

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William H. Darr School of Agriculture

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Programs

Master of Science, Plant Science

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Program Description

This program is designed to prepare students to work in a wide range of jobs related to the production and economic uses of plants. Employment opportunities include the areas of crop, fruit and vegetable production, biotechnology, nursery and seed production, landscape management, wine production, environmental preservation, agribusiness, teaching, research, and extension education. Students may also continue their education in a doctoral program.

The Master of Science in Plant Science is offered as an interdepartmental major from the departments of Agriculture, Biology, Chemistry, and Fruit Science. Together with the plant science program coordinator, the student selects an advisor from one of the four

departments. The student and advisor design an individual program of study, selecting courses which will help the student to achieve his/her career goals.

During the first semester, the student declares an area of specialization and begins to pursue a research problem (project) with close supervision of a graduate faculty advisory committee. Research areas include fruit production, soils and plant nutrition, ornamental plants and landscaping, plant physiology, enology and viticulture, crop management systems, plant genetics, and economic botany.

Most course work is usually completed by the end of the second or third semester, and the research and thesis completed after four or five semesters. A comprehensive exam is taken during the second year.

Graduate Assistantships

Evaluation of applications for assistantships begins on March 1 (fall assistantships) and October 1 (spring assistantships), and will continue until positions are filled. Applicants must first be accepted into the program, and files must be complete to be considered.

Retention Requirements

To remain in the program, students must maintain a GPA of 3.00 and make satisfactory progress on the thesis research.

Admission Requirements

Students admitted to the plant science program in full standing must meet the following requirements.

1. The student must meet all Graduate College Admission requirements (See Admission to Graduate Study under Graduate College section of catalog). Students who do not meet the grade point standards outlined, but are admitted on the basis of their GRE scores, will be required to complete a minimum of 9 hours of specified graduate courses with a GPA of at least 3.00 before being approved for an Advisory-approved Program of Study in the program.
2. The student must submit Graduate Record Examination (GRE) scores from the General Test portion.
3. International applicants are also required to submit a score for the Test of English as a Foreign Language (TOEFL) of not less than 550 on the paper-based or a comparable score of 213 on the computer-based with a minimum of 50th percentile on the Listening Comprehension Section.
4. The student must possess an undergraduate degree with a background in an appropriate natural or applied science including one semester of genetics and one semester of organic chemistry or equivalents thereof. Applicants lacking the background courses may be admitted, but will be required to complete any of these deficiencies with appropriate course work.
5. The student must receive a positive evaluation from the Graduate Coordinator of the Plant Science program before being recommended to the Graduate College for admittance into the program.

Accelerated Master's Degree Option

Missouri State University majors in Agriculture, Biology, and Chemistry have the option to apply for preliminary acceptance into the MS in Plant Science program if they meet the requirements of the accelerated master’s option. This option is tailored to those undergraduates who have acquired considerable plant science-related research experience in a laboratory through the departments of Agriculture, Biology or Chemistry at Missouri State University. Students who are accepted to the accelerated program will be able to count a maximum of 12 credit hours of 600-or higher level course towards both their undergraduate and graduate degrees. The courses must be in the area of economic botany, plant physiology, plant genetics, crop management systems, plant nutrition, soils, chemistry, ecology, fruit production, viticulture, enology, or ornamental plants and landscaping. Courses to be counted toward both degrees must be identified jointly in agreement with the undergraduate advisor, the student’s research mentor, and the Plant Science Program Director. This option will enable Agriculture, Biology or Chemistry majors to potentially meet the requirements for the MS in Plant Science degree within two semesters following the completion of the undergraduate degree. Contact the Plant Science Program

Director for details and additional information.

To be allowed to enroll in a course which is counted toward both the undergraduate and graduate degree, the student must be accepted as an advisee by a graduate faculty member and must be admitted into the accelerated program and have the permission of his/her undergraduate advisor, the Plant Science Program Director and the Dean of the Graduate College. These signature approvals are shown on the Mixed Credit Form which is required prior to the end of the Change of Schedule Period for the selected semester.

Admission Requirements for the Accelerated Master's Option

1. Junior or senior standing and a GPA of 3.25 or higher.
2. A minimum of 25 credit hours of undergraduate hours relevant to plant biology (as determined by the undergraduate advisor, the student's research mentor, and the Plant Science Program Director) with a GPA of 3.50 or higher.
3. Laboratory research experience relevant to plant science under the direction of a faculty member in Agriculture, Biology or Chemistry at Missouri State University.
4. Acceptance of the student as an advisee by a member of the MS in Plant Science Graduate Faculty.
5. Approval by the MS in Plant Science Graduate Advisory Committee.

Degree Requirements (32 hours)

1. Graduate Advisory Committee. Initially, each admitted student will be advised by the graduate coordinator of the Plant Science program. As soon as possible, the student, in conjunction with the graduate coordinator, will select a graduate faculty member from one of the four participating departments to chair a graduate advisory committee. Together with the student, the chairperson of the graduate advisory committee will select a minimum of two additional graduate faculty members from one or more of the participating departments. This committee will supervise the remainder of the candidate's program.
2. Program of Study. If not a part of the student's previous academic experience, courses in plant physiology (BIO 644) and biometry (BIO 650) or applied statistics (MTH 645) must be completed within the first year of the program. The remainder of the candidate's program will be structured by the advisory committee in consultation with the student. Academic background, professional experience, and career objectives will be considered in establishing the individual's program.
3. Course Requirements. The student is required to successfully complete a minimum of 32 hours. Course work taken from the Departments of Agriculture, Biology, Chemistry, Fruit Science, or Mathematics must total at least 23 hours with a minimum of 16 hours from courses numbered 700 through 799 inclusive.
4. Colloquium. Two hours of credit must be earned in AGP 700, Plant Science Colloquium.
5. Electives. Upon approval of the advisory committee, graduate courses from related fields may be selected to a maximum of 9 hours within the 32-hour degree requirement.
6. Research Requirement.

   Thesis Option: The Thesis option requires the completion of a research thesis supervised by the student's advisory committee. The thesis shall be approved by the advisory committee and by the Graduate College before the degree is granted. A maximum of six hours of thesis credit can be applied toward the minimum hours required for the master's

degree. An oral defense of the thesis is required.

Non-Thesis Option: The Non-Thesis option requires the completion of a minimum of one semester course which shall require an extensive research paper or creative work. The student's advisory committee must approve the final research paper and complete a Seminar Report Form that is submitted to the academic department chosen as the major area of concentration and subsequently to the Graduate College for the approval of the Dean.

7. Qualifying Examination. A written qualifying examination will be administered after most of the course work has been completed. This examination must be passed by the candidate before a degree will be given.

Master of Natural and Applied Science

See program description listed separately under the College of Natural and Applied Sciences. Accelerated masters opportunity available.

Master of Science in Education, Secondary Education: Agriculture Area of Emphasis

Contact Dr. James Hutter and see program requirements for the M.S.Ed., Secondary Education under Interdisciplinary Graduate Programs.

Agricultural Requirements

AGE 718 Topics in Agricultural Education	3 hrs
Additional course work in Agriculture	12 hrs
Total	15 hrs

Agricultural Business Courses

AGB 614 International Agricultural Trade

Recommended Prerequisite: AGB 334 or MKT 350. Gains from trade, agricultural trade policies of exporters and importers, exchange rates, multilateral trade negotiations, preferential trade agreements, technical barriers and environmental regulations and trade. May be taught concurrently with AGB 514. Cannot receive credit for both AGB 514 and AGB 614. 3(2-2) D

AGB 624 Agricultural Prices

Recommended Prerequisite: AGB 334. Factors influencing the level and movement of agricultural commodity prices and prices of agricultural inputs. May be taught concurrently with AGB 524. Cannot receive credit for both AGB 524 and AGB 624. 3(2-2) F,S

AGB 684 Farm Business Management

Recommended Prerequisite: AGB 144. Economic principles applied to the organization and operation of agricultural units; tools of decision-making; and factor allocation. May be taught concurrently with AGB 584. Cannot receive credit for both AGB 584 and AGB 684. 3(2-2) F,S

Agricultural Education Courses

AGE 608 Teaching Adults in Vocational Education

Prerequisite: permission of instructor. Rise of the adult education movement; learning abilities, educational interests and vocational needs of adults; problems and procedures in organizing and operating adult education programs; relationship of adult education to public school education. Identical with AGV 627 and SEC 627. Cannot receive credit for AGV 627 and SEC 627 and AGE 608. May be

taught concurrently with AGE 508. Cannot receive credit for both AGE 508 and AGE 608. 3(3-0) D

AGE 628 Agriculture Education-Special Topics

Prerequisite: permission of instructor. Special study of agricultural education topics not covered in other courses. Course may be repeated to a total of 5 hours provided the same topic is not duplicated. May be taught concurrently with AGE 518. Cannot receive credit for both AGE 628 and AGE 518. 1-3 D

AGE 648 Agriculture in the Classroom

Course is designed to help elementary teachers better appreciate the importance of agriculture in their student's lives and to better understand Missouri agriculture. Course stresses integration of resources available from the agricultural industry across the curriculum. May be taught concurrently with AGE 548. Cannot receive credit for both AGE 548 and AGE 648. 1(1-0) Su

AGE 658 Teaching of Agriculture

Prerequisite: SEC 302 and EDC 350 and teacher certification students must be admitted to the teacher education program. Establishing objectives and organizing the course, selecting textbooks and equipment, securing and using teaching aids; using workbooks and notebooks, planning field trips, selecting and supervising projects. Credited only on B.S. in Education (Secondary). A grade of "C" or better is required in this course in order to take AGE 493 or AGE 494. May be taught concurrently with AGE 558. Cannot receive credit for both AGE 558 and AGE 658. 3(3-0) S

AGE 668 Course and Program Building in Agricultural Education

Prerequisite: AGE 318 and AGE 658. Organization and analysis of agricultural instruction courses and programs; including the adoption of resource materials to meet individual student needs. May be taught concurrently with AGE 568. Cannot receive credit for both AGE 568 and AGE 668. 3(3-0) S

AGE 678 Methods of Teaching Agricultural Management

Prerequisite: AGE 318 and AGE 658. Identification, development, and utilization of supervised agriculture experience programs in Agricultural Education that includes methods of teaching program management, record keeping, and appropriate methodologies. May be taught concurrently with AGE 578. Cannot receive credit for both AGE 578 and AGE 678. 2(2-0) S

AGE 688 Methods of Teaching Agricultural Laboratory Management

Prerequisite: AGE 318 and AGE 658. Prepare prospective agricultural science teachers to determine subject matter, methods of teaching, and organization of equipment and facilities as applied to agricultural laboratories in high schools. May be taught concurrently with AGE 588. Cannot receive credit for both AGE 588 and AGE 688. 2(1-2) S

AGE 718 Topics in Agricultural Education

Prerequisite: permission of instructor. Current developments and trends in teaching agricultural education as well as new developments in resources and techniques. May be repeated, however, only 9 hours will count towards the graduate program of study. 1-3 D

AGE 728 Induction Year Teaching I

Prerequisite: permission of instructor. Course for the professional development of first-year teachers of agriculture. The course focuses on the pedagogical knowledge, skills, and attitudes and managerial skills needed by beginning teachers of agriculture. 2(2-0) F,S

AGE 738 Induction Year Teaching II

Prerequisite: AGE 728. Course for the professional development of second-year teachers of agriculture. The course is a continuation of AGE 728 and focuses on the pedagogical knowledge, skills, and attitudes and managerial skills needed by beginning teachers of agriculture. 2(2-0) F,S

Agricultural Natural Resources Courses

AGN 605 Advanced Soil Fertility

Theoretical and applied aspects of soil fertility emphasizing ion transport, nutrient availability, and root absorption in soils-plant environments. May be taught concurrently with AGN 405. Cannot receive credit for both AGN 605 and AGN 405. 3(2-2) S

AGN 655 Soil Genesis, Morphology and Classification

Recommended Prerequisite: AGN 465. Pedogenetic processes, macromorphology, micromorphology, redoximorphic features, and classification as related to soil taxonomy, with GIS applications for use of soil survey information discussed, if time allows. May be taught concurrently with AGN 455. Cannot receive credit for both AGN 655 and AGN 455. 3(2-2) D

AGN 725 Advanced Soils Interpretations

Recommended Prerequisite: AGN 465. Field interpretation of physical and chemical properties, water relationships, and soil landscape relationships. 3(2-3) D

Agricultural Plant Science Courses

AGP 613 Insects Affecting Horticulture and Forestry Crops

Prerequisite: permission of instructor. Identification, life histories and control methods of insects affecting gardens, ornamental plants, orchards and forests. May be taught concurrently with AGP 513. Cannot receive credit for both AGP 613 and AGP 513. 3(1-4) F

AGP 643 Plant Propagation

Recommended Prerequisite: AGP 103; and AGN 115 or BIO 121; and CHM 105 or CHM 106 or CHM 107 or CHM 160. Practices employed by fruit and ornamental plant producers in propagation of plants, including seeds, cuttings, layerings, grafting and micropropagation. Supplemental course fee. May be taught concurrently with AGP 573. Cannot receive credit for both AGP 643 and AGP 573. 3(2-2) SO

AGP 675 Plant Breeding and Genetics

Recommended Prerequisite: AGP 103 or AGN 115. Application of genetic principles to the improvement of crop plants. Includes self-pollinated, cross-pollinated, and asexually-propagated crops. May be taught concurrently with AGP 575. Cannot receive credit for both AGP 675 and AGP 575. 2(2-0) S

AGP 700 Plant Science Colloquium

Prerequisite: permission of graduate coordinator. A series of oral presentations on new developments in plant science. Presentations to be made by faculty members, students, and guest speakers from industry and academe. May be repeated, but not more than 2 hours may be counted toward the M.S. degree. 1(1-0) F,S,Su

AGP 701 Advanced Pomology

Prerequisite: permission of instructor. The culture and management of perennial fruit crops adapted to temperate climates. Physiology, technology, and research as it applies to modern production practices will be emphasized. May be taught concurrently with AGP 393. Students cannot receive credit for both AGP 701 and AGP 393. 3(3-0) F

AGP 711 Viticulture

Recommended Prerequisite: BIO 644. Principles of growing grapes based upon the genetics, physiology, development and morphology of the genus Vitis; the environments in which grapes are grown; and the uses of grapes. 3(3-0) S

AGP 721 Enology

Recommended Prerequisite: BIO 310. The course will study the chemistry, microbiology, and technology of modern wine production. 3 (3-0) S

AGP 722 Enology Lab

Prerequisite: AGP 721. Laboratory techniques in assessing wine production methods and quality. 2(0-4) F

AGP 730 Advanced Topics in Plant Science

Prerequisite: permission of instructor. An advanced topic in plant science will be addressed via faculty lectures and student projects. Examples of proposed topics include: Improved Disease Resistance in Viticulture, and Application of Field Collected Data to Computer Analysis. Variable content course. May be repeated to a total of 6 hours with differing topics. 3(3-0) F

AGP 731 Plant Genetic Engineering

Prerequisite: permission of instructor. Principles, methodology, and commercial applications of plant biotechnology. Includes brief introduction to nucleic acid structure, gene regulation, and genome organization in eukaryotic and prokaryotic organisms. 3(3-0) S

AGP 753 Plant Stress Physiology

Prerequisite: permission of instructor. The effects of environmental stresses on plant physiological functions and plant growth, plus cultural methods to help plants adapt to stress. 3(3-0) D

AGP 773 Plant Growth Regulation

Prerequisite: permission of instructor. The role of natural and synthetic plant hormones and related compounds in the growth, reproduction and cultivation of plants. 3(3-0) D

Agriculture Courses

AGR 790 Introduction to Agricultural Research Methods

Prerequisite: permission of instructor. This course is designed to provide an introduction to the process of research. The course will address planning, conducting, and reporting research; and development of good consumers of research. 3(3-0) D

AGR 796 Science Internship

Completion of an internship project (80 hours/credit hour, 6 credit hours maximum) at a discipline-related business, nonprofit organization, or government agency, approved and supervised by both the departmental and internship advisors. Includes a formal report in the appropriate professional format, and an oral presentation at an approved venue. Graded Pass/Not Pass only. No more than 6 hours may count toward a masters degree. 1-6 F,S,Su

AGR 797 Seminar

Prerequisite: permission of advisor. In-depth study in an area of agriculture, culminating in an extensive scholarly presentation. May be repeated to a total of three hours. 1(1-0) D

AGR 798 Research

Prerequisite: permission of instructor. Supervised research in agriculture. May be repeated, but not more than 6 hours may be counted toward the 32 hour degree. 1-6 F,S,Su

AGR 799 Thesis

Prerequisite: permission of instructor. Demonstration of the capacity for research and independent thought culminating in a thesis. May be repeated. A minimum of 6 hours will be applied toward a masters degree. 1-6 F,S,Su

Animal Science Courses

AGS 611 Animal Nutrition and Metabolism

Recommended Prerequisite: AGR 300 or CHM 200 or CHM 310. Utilization and metabolism of nutrients by domestic animals; role of vitamins and minerals. May be taught concurrently with AGS 511. Cannot receive credit for both AGS 511 and AGS 611. 3(3-0) S

AGS 712 Special Topics in Animal Science

Prerequisite: permission of instructor. Special study in an identified area of animal science not treated in other courses. Recent advances and new research techniques will be discussed. May be repeated when topic varies up to 6 hours. 1-3 D

AGS 716 Mammalian Reproductive Physiology

Recommended Prerequisite: AGS 302. Comparative anatomy and physiological processes of reproduction with an emphasis on domestic and laboratory animals. Fertilization through embryonic development, pregnancy, and growth to sexual maturity, reproductive efficiency and application of reproductive technology. 3(3-0) S

Agricultural Technology Courses

AGT 621 Selection and Organization of Industrial Education

Prerequisite: AGT 416 or concurrent enrollment; and AGT 420 or concurrent enrollment. Selection and arrangement of units to teach; preparation of informational and job assignments; selection, purchase and arrangement of laboratory equipment; dispensing of supplies and keeping of adequate records. Course typically taught in same semester as AGT 416 and AGT 420. Identical with AGV 621. Cannot receive credit for both AGT 621 and AGV 621. May be taught concurrently with AGT 521. Cannot receive credit for both AGT 521 and AGT 621. 3(3-0) F

Agricultural Vocational Courses

AGV 620 Occupational Analysis

Analysis and breakdown of broad occupations or specific jobs into basic elements for instructional purposes. Identical with BSE 620. May be repeated to a total of 2 hours when topic varies. May be taught concurrently with AGV 520. Cannot receive credit for both AGV 520 and AGV 620. 1-2 D

AGV 621 Selection and Organization of Industrial Education

Selection and arrangement of units to teach; preparation of informational and job assignments; selection, purchase and arrangement of laboratory equipment; dispensing of supplies and keeping of adequate records. Course typically taken in same semester as AGT 416. Identical with AGT 621. Cannot receive credit for both AGV 621 and AGT 621. May be taught concurrently with AGV 521. Cannot receive credit for both AGV 521 and AGV 621. 3(3-0) D

AGV 622 Philosophy of Vocational Education

Philosophical foundations of vocational education; philosophies of vocational education in the contemporary school. Identical with SEC 622 and BSE 622. May be repeated to a maximum of 3 credit hours when topic varies. May be taught concurrently with AGV 522. Cannot receive credit for both AGV 522 and AGV 622. 1-3 D

AGV 623 Guidance for Vocational Development

Materials, procedures, and problems involved in the guidance of individuals in the selection of, preparation for, and advancement in a vocation. Identical with BSE 623. May be repeated to a total of 3 hours when topics varies. May be taught concurrently with AGV 523. Cannot receive credit for both AGV 523 and AGV 623. 1-3 D

AGV 625 Organization and Management in Vocational Education

A systematic approach to defining and measuring occupational knowledge, skills and attitudes based upon an occupational analysis, instructional methodology, evaluation, and program standards. May be taught concurrently with AGV 525. Cannot receive credit for both AGV 525 and AGV 625. 3(3-0) D

AGV 626 Coordination of Cooperative Education

Problems and procedures in organizing and operating part-time cooperative and evening occupation programs. Identical with BSE 626 and SEC 626. May be repeated to a total of 2 hours when topic varies. May be taught concurrently with AGV 526. Cannot receive credit for both AGV 626 and AGV 526. 1-2 D

AGV 627 Teaching Adults in Vocational Education

Rise of the adult education movement, learning abilities, educational interests, and vocational needs of adults; problems and procedures in organizing and operating adult education programs; relationship of adult education to public school education. Identical with AGE 608 and SEC 627. Cannot receive credit for AGV 627 and AGE 608 and SEC 627. May be taught concurrently with AGV 527. Cannot receive credit for both AGV 527 and AGV 627. 3(3-0) D

AGV 628 Measurement and Evaluation of Vocational Education Programs

Means for assessing specific program needs as determined from occupational surveys and other demographic data; follow-up techniques to evaluate the overall effectiveness of the program to the manpower needs in a given labor market area. Identical with BSE 628 and SEC 628. May be repeated to a total of 3 hours with departmental approval when topic varies. May be taught concurrently with AGV 528. Cannot receive credit for both AGV 528 and AGV 628. 1-3 D

AGV 676 Teaching of Industrial/Vocational Subjects

Instructional methods and techniques of teaching industrial/vocational education subjects; attaining objectives of career and technical education, design and evaluation of instructional units; classroom and laboratory management; and development of evaluative instruments. May be taught concurrently with AGV 576. Cannot receive credit for both AGV 576 and AGV 676. 3(3-0) D

AGV 724 Organization and Administration of Vocational Education

Prerequisite: permission of instructor. Problems, procedures and local, state and federal relationships in the organization and administration of vocational education in the contemporary school. Identical with SFR 724. May be repeated to a total of 3 hours when topic varies. 1-3 D

AGV 726 Seminar in Industrial Education

Prerequisite: permission of instructor. Presentation and discussion of professional or technical problems in the organization and management of programs and facilities in industrial education. 3(3-0) D

AGV 760 Special Investigations

Prerequisite: permission of instructor. The student, in consultation with the advisor, selects for in-depth study an area determined by the interest/career objectives of the student. Based on demand and timeliness of the subject, a cluster study group may engage in a joint investigation. 1-5 D

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