



**Department of Dairy and Animal Science
Department of Poultry Science
College of Agricultural Sciences
The Pennsylvania State University**

Graduate Program in Animal Science Student Handbook

Policies Effective August 2004 and January 2008

This publication is available in alternative media on request.

The Pennsylvania State University encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact Paula Morgan, 814-863-3665 in advance of your participation or visit.

NOTE: Please **do not** submit information with your application that cannot be used in the admission decision process, e.g., Individual Education Plans (IEPs), medical records, statements from physicians or psychologists, or legal documents. Such information will be returned by your intended program of study.

“Sexual harassment of faculty, staff, or students is prohibited and will not be tolerated at The Pennsylvania State University. It is the policy of the University to maintain an academic and work environment free of sexual harassment. Sexual harassment violates the dignity of individuals and impedes the realization of the University’s educational mission. The University is committed to preventing and eliminating sexual harassment of faculty, staff, and students through educating and encouraging faculty, staff, and students to report any concerns or complaints about sexual harassment. Prompt corrective measures will be taken to stop sexual harassment whenever and wherever it occurs.” (Policy AD41 Sexual Harassment)

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 201 Willard Building, University Park, PA 16802-2801, Tel 814-865-4700/V, 814-863-1150/TTY.

Updated 6/10

Table of Contents

General Information	3
Program of Study	3
Research Facilities	3
Financial Aid	3
Cost of Study	3
Housing.....	3
Student Population.....	3
The Area	4
The University	4
Application	4
Correspondence and Information	4
The Graduate Faculty and Their Research Programs.....	5
Admission Requirements	7
For Students Seeking the Master’s Degrees	7
For Students seeking the Ph.D. Degree	7
Admission Procedures	7
Guidelines for Graduate Assistants.....	8
Pay Dates	8
Limits on the Duration of Support	8
Stipend Paid to Half-time Graduate Assistants.....	8
Responsibilities of a Graduate Assistant	8
Academic Integrity.....	9
Termination for Unsatisfactory Scholarship	9
Requirements of the Graduate Program in Animal Science	10
Degree Requirements for the Masters’ Degree	10
Master of Professional Studies Degree.....	10
Master of Science Degree	11
Degree Requirements for the Doctor of Philosophy Degree	12
Additional Degree Requirements.....	16
Minor in Animal Science.....	17
Summary of Graduate School Requirements for Ph.D. Candidate.....	17
Residency	17
Continuous Registration	17
Time Limitation.....	17
Guide for Thesis Preparation	18
Semester Schedules for Degree Progress.....	21
Master of Professional Studies.....	21
Master of Science	22
Doctor of Philosophy	23
Services and Supplies	25
General Information	25
Procedures for Obtaining Keys.....	25
Procedures for Parking Permits.....	25
Availability of Services and Supplies to Graduate Students in the Program	26
Graduate Application Materials	27
How to Apply.....	27
Application Form for the Graduate Program in Animal Science.....	28

General Information

Program of Study

The Departments of Dairy and Animal Science and of Poultry Science in Penn State's College of Agricultural Sciences offer a graduate program in Animal Science leading to the Master of Professional Studies (M.P.S.), Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) degrees. The plan of study followed by a degree candidate is determined by the candidate's background and interests. The academic program is developed jointly by the student and the advisor, with the approval of the student's graduate committee.

The M.P.S. program is designed to prepare individuals for specialist and management positions in county agricultural extension, government, or industry, and requires a final paper. The M.P.S. is generally considered to be a terminal degree.

The M.S. is a research-oriented degree, requiring the successful completion of a research project and thesis. The completion of 30 credits, including at least 18 at the graduate level (500, 600), is required.

The Ph.D. degree is awarded for creative scholarship and research. A student is admitted to Ph.D. candidacy upon passing the candidacy examination. Doctoral candidates must satisfy the two-semester residence requirement, write an acceptable dissertation, and pass both comprehensive and final oral examinations.

Research Facilities

The departments maintain numerous facilities for research involving both small and large animals. Laboratories are equipped with the latest instrumentation. Over 2,000 head of livestock, including dairy and beef cattle, sheep, swine, deer, horses, as well as flocks of poultry, including chickens, turkeys, and quail, are maintained for instruction and research. Students may specialize in animal management, breeding, genetics and genomics, growth and developmental biology,

meat science, nutrition, and nutritional, reproductive, or lactational physiology as well as animal gene transcription.

Financial Aid

Financial assistance is awarded on a competitive basis. Fellowships varying from a complete stipend and tuition grant-in-aid to partial stipends or a grant-in-aid alone are available on a University-wide basis. Teaching and research assistantships are funded through either University funds or grants awarded to individual faculty members. Graduate assistants receive stipends and tuition grant-in-aid in exchange for performing assigned duties determined by the needs of the program and the faculty advisor.

Responsibilities of graduate assistants are described on page 8.

Cost of Study

Tuition per semester is currently \$6,974 for Pennsylvania residents and \$12,575 for non-residents for full-time study, or \$581 per credit for residents and \$1,048 for non-residents enrolling in 9 or fewer credits.

Housing

Housing for students is available in apartment complexes located a short distance from the campus. Dormitory accommodations provide both single and double rooms in two centrally located buildings on campus. Students may use the University food service. Married graduate students may apply for apartments designated by the University for their use.

Student Population

The University Park campus has a total enrollment of approximately 41,000 students, of which about 6,200 are graduate students. Approximately 30 percent of the graduate students at University Park are international students. There are typically 15 graduate students in the Graduate Program in Animal Science, somewhat more women than men.

The Area

Penn State is located in the State College area (population about 70,000, including students) in central Pennsylvania. Primarily a university town, State College offers many cultural, educational, recreational, and sports events. The area is rich in facilities for skiing, picnicking, hiking, biking, and swimming. State forest and game lands provide excellent hunting and fishing.

The University

The Pennsylvania State University is the land-grant University of the Commonwealth of Pennsylvania. It was chartered in 1855 as the Farmers' High School. During the next century, the school evolved from the Agricultural College of Pennsylvania (1862) to the Pennsylvania State College (1874) and finally, in 1953, to The Pennsylvania State University. The original student body of 69 has grown to over 90,000, the faculty from four to over 5,200. Eleven undergraduate colleges offer 160 baccalaureate and 31 associate degree majors. The Graduate School, established in 1922, administers over 140 major programs. Approximately 1,700 advanced degrees are conferred annually, of which about 400 are doctorates.

Application

Applications for admission to the Animal Science Graduate Program may be submitted at any time, and will be processed on a space-available basis. Applicants should have a baccalaureate degree in Animal Science, Dairy Science, Poultry Science, or a related biological discipline, and a junior-senior GPA of at least 3.0 (4.0 basis).

See Appendix for methods of application and Appendix, for the Departmental Application form, or visit our web site: <http://gradsch/prospective/apply.html>

Correspondence and Information

(For applications/admission)

Daniel Hagen, Graduate Officer
Department of Dairy and Animal Science
324 W. L. Henning Building
The Pennsylvania State University
University Park, PA 16802
Phone: 814-863-0723
FAX: 814-863-6042
e-mail: drh@psu.edu

The Graduate Faculty and Their Research Programs:

Bartell, Paul, assistant professor of avian biology, 205 Henning Bldg, (814) 863-2101, pab43@psu.edu. The neurobiology of biological clocks and their role in timing avian reproduction, migration, and sleep/wake cycles.

Baumrucker, Craig R., professor of animal nutrition/physiology, 302 Henning Bldg., (814) 863-0712, crb@psu.edu. Endocrine and growth factor regulation (IGF System) of mammary growth and differentiation, and endocrine and growth factors in milk and their role in mammals.

Comerford, John W., associate professor of dairy and animal science, 351 Agricultural Sciences and Industries (ASI) Bldg., (814) 863-3661, jxc16@psu.edu. Beef cattle nutrition, genetics, and management.

Dechow, Chad, associate professor of dairy and animal science, 333 Henning Bldg., (814-863-3659), cdechow@psu.edu. Dairy cattle genetics.

Diaz, Francisco, assistant professor of reproductive biology, 206 Henning Bldg. (814) 865-1499. fjd10@psu.edu. Development of mammalian and avian transgenic model systems to study ovarian biology, molecular and cellular interactions between female germ cells and somatic cells of the ovary.

Etherton, Terry D., distinguished professor of animal nutrition and head of the Department of Dairy and Animal Science, 324 Henning Bldg., (814) 863-3665, TEtherton@psu.edu. Regulation of adipose tissue and skeletal muscle growth by somatotropin and IGF-I.

Hagen, Daniel R., professor of animal science, 316 Henning Bldg., (814) 863-0723, drh@psu.edu. Reproductive physiology, gamete and embryo physiology, and gonadal function.

Harpster, Harold W., professor of animal science, 350 ASI Bldg., (814) 863-0734, HHarpster@psu.edu. Nutrition and management of beef cattle and sheep, utilization of forage and nonconventional feeds, and ruminant nutrition.

Heinrichs, Arlyn J., professor of dairy and animal science, 347 ASI Bldg., (814) 863-3916, JHeinrichs@psu.edu. Dairy calf and heifer nutrition and management, and forage utilization.

Holden, Lisa A., associate professor of ruminant nutrition, 321 ASI Bldg., (814) 863-3672, LHolden@psu.edu. Ruminant nutrition and forage systems, including grazing systems.

Hristov, Alexander, associate professor of dairy nutrition, 352 ASI Bldg., (814) 863-3669, anh13@psu.edu. Nitrogen metabolism in the rumen and reducing losses from dairy operations.

Hulet, R. Michael, professor of poultry science, 222 Henning Bldg., (814) 863-8934, mrh4@psu.edu. Turkey and broiler management with emphasis on factors affecting meat yield, reproduction, and hatchability.

Kephart, Kenneth B., professor of animal science, 306 ASI Bldg., (814) 863-3671, kbk2@psu.edu. Non-ruminant nutrition, and swine management.

Liu, Wansheng, associate professor of genomics, 305 Henning Bldg., (814) 867-1673, wul12@psu.edu. Animal genetics, structural, functional and comparative genomics, mammalian Y-chromosome and male fertility

Mills, Edward W., associate professor of dairy and animal science, 304 ASI Bldg., (814) 863-0669 or 16 Meats Laboratory, (814) 865-2394, EMills@psu.edu. Meat science and meat processing.

Ott, Troy, L., associate professor of reproductive physiology, 321 ASI, (814) 441-2657, tott@psu.edu. Uterine biology, reproductive immunology, fertility, mucosal immunity.

Staniar, W. Burton, assistant professor of equine science, 301 Henning Bldg., (814) 865-0698, wstaniar@psu.edu. Relationships of nutrition with metabolism in the horse. Specific areas of research include investigating nutrition's influence on skeletal development, characterizing animal and feed factors that affect glycemic and insulinemic response, and studying the implications of glycemic and insulinemic responses on growth hormone and IGF-I. This work aims to improve nutrition and management practices directed at growing successful equine athletes

Pate, Joy L., professor of reproductive physiology, C. Lee Rumberger Family Chair in Agricultural Sciences, 318 ASI Bldg., (814) 863-0558). Female reproductive biology, reproductive immunology, molecular and cellular approaches to ovarian function in cattle.

Patterson, Paul H., professor of poultry science, 223 Henning Bldg., (814) 865-3414, php1@psu.edu. Poultry nutrition with management emphasis on commercial pullets and laying hens, egg production, egg quality, and poultry by-products.

Ramachandran, Ramesh, associate professor of avian endocrinology, 211 Henning Bldg., (814) 865-5202, RameshR@psu.edu. Molecular and cellular mechanisms in neuroendocrine control of growth and reproduction in birds. Development of transgenic animals utilizing lentiviral vectors.

Shashikant, Cooduvali, associate professor of transgenic biology, 323 ASI Bldg., (814) 863-0658, css13@psu.edu. Developmental and evolutionary aspects of regulation of patterning genes.

Swinker, Ann, associate professor of equine science, 309 ASI Bldg., (814) 865-7810, aswinker@psu.edu. Management, environmental, behavior and reproductive issues in horse production.

Varga, Gabriella A., distinguished professor of animal science, 348 ASI Bldg., (814) 863-4195, GVarga@psu.edu. Factors affecting intake, forage utilization, carbohydrate and protein metabolism in dairy cattle, and ruminant nutrition.

Vasilatos-Younken, Regina, professor of poultry science and Senior Associate Dean of the Graduate School, 203 Henning Bldg., (814) 865-4642, rxv@psu.edu. Endocrine regulation of nutrient partitioning and soft tissue deposition in meat-type poultry.

Admission Requirements:

For Students Seeking the Master of Science or Master of Professional Studies Degree

- (1) For admission without deficiencies, a student must have completed a baccalaureate degree program in Animal Science, Dairy Science, Poultry Science, or another biological science with a junior-senior grade-point average of at least 3.0 (4.0 basis). The program must have included courses in biological science, chemistry, and mathematics. Exceptions to the minimum grade-point average may be made for students with special backgrounds, abilities, or interests.
- (2) GRE scores will be utilized in evaluating the applicant's qualifications. In 2009, the average scores for students admitted to the Animal Science program were 474, 649, and 3.78 for verbal, quantitative, and analytical, respectively.
- (3) The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). The minimum acceptable score for the TOEFL is 550 for the paper-based test or a total score of 80 with a minimum 20 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement if they have received a baccalaureate or a masters degree from a college/university/institution in any of the

following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States and Wales.

For Students Seeking the Ph.D. Degree

- (1) A student becomes a doctoral candidate upon passing a candidacy examination administered by the Student Advisory Committee (see page 13).
- (2) Any student admitted into the Graduate Program has the option of pursuing the Ph.D. degree without first earning an M.S. degree. A student who desires to pursue this option must first be recommended to the Graduate Program and Admissions Committee by the student's advisor, Student Advisory Committee, department head, and Graduate Program chair, and pass the candidacy examination.

Admission Procedures

- (1) General inquiries about admission procedures for Penn State's Graduate Program in Animal Science should be made to:

*Daniel R. Hagen, Graduate Officer
Department of Dairy and Animal Science
324 W. L. Henning Building
The Pennsylvania State University
University Park, PA 16802
Phone: 814-863-0723
FAX: 814-863-6042
e-mail: drh@psu.edu*

See Graduate Application Materials, page 27 for methods of application and Appendix, page 28-30 for the Departmental Application form.

- (2) Requests for admission to the Graduate School should be submitted by completing the online form:
<http://www.gradsch.psu.edu/portal/gateway.html>

The completed form, two transcripts, and application fee must be submitted to the Office of Graduate Admissions.

(3) Applications for admission to the Graduate Program in Animal Science may be submitted at any time. Prospective students are encouraged to submit the application as early as possible to be competitive for assistantship offers. In addition, students must apply by January 1 of each year to be competitive for Graduate School Fellowships. Applicants are screened by the Graduate Program and Admissions, Committee, who will consider the following criteria:

- academic performance
- GRE scores
- courses completed
- course deficiencies
- area(s) of interest
- letters of recommendation
- advisor availability

Recommendation for acceptance or rejection of an applicant is made to the Graduate School by a graduate officer.

Guidelines for Graduate Assistants

Pay Dates

(1) Graduate assistants are paid on the last working day of the month during the assistantship. Pay periods are August through May for the fall and spring semesters. Pay periods are June and July for the Summer Session.

(2) The approved Assistantship and Fellowship Stipend form (with a W-4 form attached) must be submitted to the Payroll Office one month before the first pay date of each semester or session.

Limits on the Duration of Support

Graduate assistant support provided from budgeted departmental resources¹ shall be limited to six semesters² for the M.S. program, 10 semesters² for the Ph.D. program (with an M.S.), and 15 semesters² for a Ph.D. program (with a B.S.). Extension beyond these limits will be evaluated by the appropriate department head on an individual basis.

Stipend Paid to Half-time Graduate Assistants³ (2007-2008 Academic Year)

Students on assistantship must maintain a grade-point average of 3.0 (4.0 basis) and make satisfactory progress towards the degree to remain on assistantship.

(1) Students pursuing the M.S. degree are paid \$13,050 for a two-semester appointment. Summer appointment stipend, if available, is \$4,377.

(2) Candidates for the Ph.D. degree are paid \$13,590 for a two-semester appointment. If available, summer appointment stipend is \$4,557.

Responsibilities of a Graduate Assistant

All graduate students receiving an assistantship within the program, regardless of funding source, are required to perform 20 hours (half-time assistants) or 10 hours of service per week (quarter-time), related to the functions of the department. This service may include the following:

¹Financial support from Penn State budgets, excluding those funds from grants/contracts/gifts.

² Summer Session is considered to be one semester.

³ Graduate assistants receive tuition grant-in-aid-i.e., tuition is paid.

- (1) general laboratory maintenance
- (2) support of farm operations
- (3) literature searches and other library work
- (4) field and laboratory assays from ongoing projects
- (5) data management and statistical analyses
- (6) assay development and preparation of laboratory protocols
- (7) assistance in preparation and grading of quizzes, examinations, and homework exercises
- (8) help in preparing and conducting teaching labs
- (9) assistance in other classroom activities
- (10) assistance in conducting extension field activities
- (11) help in preparation of documents for other departmental activities
- (12) help set up presentation materials for demonstration activities, such as Ag Progress Days
- (13) other professional activities requested by supervisor or unit leader.

Academic Integrity

Recently, several instances of dishonesty within the scientific community have been brought to the attention of the public. All students should review section 49-20 of the Penn State student handbook, Policies and Rules: A Guide for Students, to familiarize themselves with the university policy concerning academic integrity. In addition to formal courses, these regulations apply

to seminars, public presentations, and research-related endeavors. It is the responsibility of students and faculty to report suspected breeches of section 49-20 to the appropriate authorities.

The graduate faculty in the Departments of Dairy and Animal Science and of Poultry Science strive to provide students with an academic environment that will foster scholarly and creative activities. Successful completion of a graduate program in Animal Science requires the demonstration of an ability for independent thinking and creativity. Students have the opportunity to develop and display their individual abilities through participation in formal courses, seminars, and research activities. Students should contact their academic advisor or the department head if they have questions concerning the interpretation and enforcement of these policies.

Termination for Unsatisfactory Scholarship

Termination of graduate student support or graduate program for unsatisfactory scholarship or unsatisfactory progress in scholarship shall be provided to the student by advanced written notice. Furthermore, the written communication shall, in general terms, advise the student of the academic reasons for the termination according to the rules of the Graduate School, Graduate Degree Programs Bulletin Appendix III <http://www.psu.edu/bulletins/whitebook/>

Requirements of the Graduate Program in Animal Science

The program offers plans of study leading to the Master of Professional Studies (M.P.S.), Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees to selected students meeting the admission requirements established by the Graduate School and by the program. These plans are designed to provide the knowledge, training, and attitudes expected of holders of these degrees. Insofar as possible, the pattern of course work and the area of thesis research will be designed to meet the specific interests and needs of the student. These plans of study will be developed within the general procedures and regulations of the Graduate School.

I. Degree Requirements

Master's Degrees:

Time Limitation: All requirements for a master's degree, whether satisfied on the University Park Campus or elsewhere, must be met within five years or a period spanning six consecutive summers.

Residence: At least 20 credits must be earned in residence at the University Park Campus.

Minimum Number of Credits: 30

Minimum Grade-Point Average: A minimum grade-point average of 3.0 (4.0 basis) for graduate work done at the University is required for graduation.

Core Course Requirements: While in residency, 2 credits of AN SC 590, Colloquium (Effective 1/2010). One credit of AN SC 500, Readings in Animal Science. One credit of AN SC 502, Scientific Scholarship (effective 01/2008). One credit of AN SC 496A (Teaching Assistant) or AN SC 602 (Supervised Experience in College Teaching).

Master of Professional Studies Degree:

The plan of study leading to the Master of Professional Studies degree has an industry orientation and provides opportunities for students to increase their knowledge and competencies in the various fields of agriculture. A student may choose a broad plan of study over a wide spectrum of subject matter, or intensive training in a specialized area, according to his/her specific interests and needs.

The emphasis of this degree is for students to learn how to apply knowledge as professional practitioners.

An appropriate portion of the student's time will be devoted to developing skills in communication, especially technical speaking and writing. However, students will be expected to have completed most of their general education needs as undergraduates.

A minimum of 30 graduate credits is required, including at least six credits of formal courses at the 500 level. A maximum of 10 credits may be earned in special problem-type courses, which may include up to three credits for the M. P. S. paper. See Section II (page 16) for additional degree requirements.

A candidate's committee shall consist of an advisor, who shall be a member of the graduate faculty, and at least two additional members of the graduate faculty. Approval of the committee shall be by the chair of the Graduate Program in Animal Science, after consultation with the student and appropriate faculty members. If a minor is selected, a faculty member representing the minor field shall serve on the committee. The committee is responsible for approving the candidate's program and for administering the final oral examination.

The candidate shall prepare a paper on a selected professional problem as part of the program. Up to three graduate credits may be awarded for the paper. Whether required as part of a course or independent of course

work, the nature and extent of the paper, and when its development is to be undertaken, shall be determined by the candidate's committee. The paper shall contain an appropriate Literature Cited section. Two hard-bound copies of the paper, one for the advisor and one for the graduate program, shall be prepared at the candidate's expense and will be available to the public.

The paper will be in a technical and grammatical form that is acceptable to the student's committee. The committee may require the candidate to employ the services of a technical editor (at the candidate's expense) to aid the candidate to bring the paper into an acceptable form.

Upon completion of the paper, the student shall be required to present a public seminar on the work and to pass an oral examination given by the candidate's committee. This examination shall cover both course work and the paper. A report of the completed Master's Paper with the Graduate office will be filed.

While the Master of Professional Studies degree is not automatically a terminal degree, it must be understood that completion of this degree usually does not provide the preparation for pursuing the Ph.D. degree that would be obtained by completing an M.S. plan of study.

Master of Science Degree

The Master of Science degree is oriented toward research and requires the successful completion of a research study and thesis. A student devoting half time to graduate studies typically requires two years (six semesters) of course work and research to complete the M.S. degree (see page 8 for limits of support).

Minimum Number of Credits. At least 18 of the 30 credits required for the M.S. degree must be in the 500 and 600 series of courses. At least six of these credits must be in the formal 500 series. A minimum of six credits of thesis research is required. At least 12 credits must be taken as formal courses in the animal agriculture/biological science area. The student must take the core courses.

No thesis research credits (600) may be assigned a quality letter grade.

Master Committee. The Student Advisory Committee shall consist of an advisor, who shall be a member of the graduate faculty, and at least two additional members of the graduate faculty. At times it may be desirable to have two faculty serve as co-advisors. If a minor is selected, a faculty member representing the minor field will serve on the Student Advisory Committee. Selection of the committee shall be by the chair of Graduate Program in Animal Science after consultation with the student and appropriate faculty members.

The Student Advisory Committee shall be appointed during the first semester of enrollment. The advisor, in consultation with the committee, shall be responsible for selection and direction of the course of study to be followed by the student and for selection and supervision of thesis research. A research proposal and formal seminar presentation to the department should be no later than the end of the second semester. The Committee will meet following the presentation for a detailed evaluation and period of suggestions.

Thesis. A thesis reporting the results of the student's research shall be prepared in accordance with the regulations of the Graduate School and either the Department of Dairy and Animal Science or the Department of Poultry Science.

The thesis will be in a technical and grammatical form that is acceptable to the student's committee. The committee may require the candidate to employ the services of a technical editor (at the candidate's expense) to aid the candidate bringing the thesis into conformity.

In addition to the copy of the thesis required to be deposited at the Graduate School, at least two hard-bound copies must be prepared. If additional copies are required (e.g., for a granting agency or cooperator), they will be paid for by the committee chair's academic department.

Good quality copies on paper equal to that required by the Graduate School are acceptable. One bound copy will be placed in the Graduate Program in Animal Science collection. The second is for the committee chair. In cases where there are co-chairs or a separate chair and thesis research advisor, bound copies shall be prepared for both faculty members.

Electronic thesis can be submitted. Go to www.gradsch.psu.edu/current/thesis.htm for details.

Manuscript. The student shall be required to prepare at least one manuscript based on the thesis research results in a form suitable for publication in an appropriate refereed scientific journal.

Examination. Upon completion of the thesis, the student shall present a public seminar on the research and shall be required to pass an oral examination given by the candidate's committee. This examination shall cover both course work and thesis. The committee will file a report (form available in 312 Henning) on the student's performance. The committee may recommend that the student be passed, failed, or given a re-examination. Only one re-examination shall be offered.

Requirements of the Graduate Program in Animal Science

Doctor of Philosophy Degree:

Time Limitation: All requirements for a Doctor of Philosophy degree, whether satisfied on the University Park Campus or elsewhere, must be met within five years or a period of spanning six consecutive summers.

Residence: Within some 12-month period between admission to candidacy and a Ph.D completion, the candidate must spend at least two semesters in residence at the University Park Campus.

Minimum Number of Credits: 30 beyond a baccalaureate degree from an accredited school.

Minimum Grade-Point Average: A minimum grade-point average of 3.0 (4.0 basis) for graduate work done at the University is required for graduation.

Core Course Requirements: While in residency, 3 credits of AN SC 590, Colloquium or 5 credits if no Master's Degree (effective 1/2010). Two credits of AN SC 500, Readings in Animal Science. Two credits of AN SC 502, Scientific Scholarship. One credit of AN SC 496A (Teaching Assistant) or AN SC 602 (Supervised Experience in College Teaching).

Student Advisory Committee: The Student Advisory Committee shall be appointed during the first semester of enrollment. The committee shall be responsible for selection and direction of the course of study to be followed by the student and for advise of thesis research. The student Advisory Committee shall consist of a chair and at least three additional members of the graduate faculty. One member shall be selected from outside the Graduate Program in Animal Science and shall represent the minor field, if one has been selected. Selection of the committee shall be by the chair of the Graduate Program in Animal Science after recommendations by the student and academic advisor. The student's advisor shall have consulted with the student and appropriate faculty members. Formation of the Doctoral Committee occurs after the student passes the candidacy examination (page 13).

Time Required to Earn Degree. A student devoting half-time to study for the degree normally will require 10 semesters beyond the Master's degree, or 15 semesters if entering the program without an M.S. degree. However, much will depend upon the nature of the thesis research problem. In most cases a student will not take more than five years to complete the program from the date of admission to candidacy (see limits of support, page 8).

Residence Requirements. Within some 12-month period between admission to candidacy and completion of the Ph.D., the candidate must spend at least two semesters (which may include the semester in which the candidacy examination is taken) as a registered, full-time student engaged in academic work on the University Park Campus. Full-time University employees must be certified by the department as devoting half time or more to graduate studies and (or) thesis research to meet the degree requirements.

Off-campus and Transfer Credits. In accord with guidelines set forth by the Graduate School, the following types of off-campus and transfer credits may be applied toward requirements for the doctorate:

- (1) A completed master's degree.
- (2) A maximum of 30 credits beyond the baccalaureate at an accredited school not granting the doctorate in the student's program.
- (3) A maximum of 60 credits beyond the baccalaureate at an accredited graduate school that grants the doctorate in the candidate's major program.
- (4) A student may register for research to be done away from the University Park Campus, provided it is approved by the advisor and the chair of the program

Candidacy Examination. The purpose of the candidacy examination is to determine the student's qualifications to pursue a doctoral degree and to determine any course deficiencies that should be considered.

Therefore, it should be taken early in the student's program. It shall be administered before 15 graduate credits have been completed beyond that of the M.S. degree or equivalent. In the case of students without an M.S. degree, the examination should be taken after 18 credits have been earned.

Master of Science (MS) as a Candidacy Exam

The completion of a MS degree in the appropriate biological topic area may be considered to fulfill the candidacy exam requirement. The MS advisory committee may request that this occur and provide the MS thesis and associated manuscripts to the candidacy committee for consultation. The three voting members shall render a yes or no decision.

The Candidacy Committee, consisting of two graduate faculty from AN SC and the chair of the Animal Science Graduate Program & Admissions Committee shall assess the student's English competency and administer the candidacy examination. The faculty advisor will be present as a non-voting member. The examinations may be administered at any time so long as this complies with the guidelines listed above. The candidacy examination shall consist of the following:

The student shall present a critique of an assigned published manuscript to the candidacy committee. This presentation will also serve as a means to evaluate English competency.

The decision as to whether the student has been successful in the entire candidacy examination shall be rendered by majority decision of the Candidacy Committee. The decision will be to pass, fail, or re-examine (only one re-examination shall be offered). At the conclusion of the candidacy examination, the chair of the Candidacy Committee will notify the student, the graduate officer, and the dean of the Graduate School whether the student has been accepted as a doctoral candidate. Reports on the Candidacy Examination are filed for the program as well as the Graduate School.

Policy for English Competency Assessment and Rectifying Deficiencies (effective Fall 1992).

A candidate for the degree of Doctor of Philosophy is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communications requirements for the Ph.D. (International students should note that passage of the minimal TOEFL requirement does not necessarily demonstrate the minimal level of competence expected of a Ph.D. candidate at Penn State).

- (1) *Assessment of English Competency:* the Advisory Committee in conjunction with the candidacy examination will conduct the Assessment of English Competency. To evaluate competency in writing, each student will read and prepare a written critique of a journal article selected by the committee. The paper will be related to the field of study of the student. This exercise will be administered within three days after completion of the written component of the candidacy examination. The student's competency in spoken English will be judged during the oral component of the candidacy examination.
- (2) *Improving English Competency of Students Having Deficiencies:* Each student who has been judged deficient will be required to (a) present an oral seminar, and (b) prepare a written review paper on the topic of his/her seminar for each of two semesters. The oral seminar will be evaluated by the program's Seminar Committee. The student's Advisory Committee will be responsible for evaluating the written papers.
- (3) *Reassessment of English Competency for Students Having Deficiencies:* After the student has completed two credits of seminar (one per semester) with a grade of at least B, the student will be re-examined by the faculty members who comprised his/her Advisory Committee. He/she will be asked to read a journal article from his/her field and prepare a written critique for this

examination. The student must make an oral presentation of the critique to the committee. Reassessment of English competency must be made before the comprehensive examination can be scheduled. Failure to demonstrate English competency to the satisfaction of the student's Advisory Committee at this reassessment will result in termination of the student from the Graduate Program in Animal Science.

Advisor(s) and Doctoral Committee.

Coincident with admission to the Graduate School, the student shall be assigned to an advisor. The program chair shall designate the advisor after consultation with the student and the faculty member. At times it may be desirable to have co-advisors. In most instances the advisor will be the chair of the doctoral committee and the supervisor of the thesis research.

After the student has been admitted to candidacy for the Ph.D. degree, the dean of the Graduate School, upon recommendation of the chair of the Graduate Program in Animal Science, will appoint a doctoral committee consisting of at least four members of the graduate faculty. At least one member shall be from outside the candidate's major program and shall represent the minor field, if one has been selected. The outside member of the committee shall have no budgetary connection to the department to which the student belongs. The committee will be responsible for establishing the candidate's program; will prepare, administer, and evaluate the candidate's comprehensive and final examinations; and will supervise and evaluate the thesis. In most circumstances, the Advisory Committee will serve also as the Doctoral Committee.

Major and Minor Fields. A candidate majoring in Animal Science must meet the requirements of the major as specified in Section II (page 16, Additional Degree Requirements).

If desired by the student, the candidate's advisor, in consultation with the doctoral committee, will aid in selecting a minor field of study. If the candidate elects one, a minimum

of 15 credits must be taken in the minor. The minor program must meet the approval of the department or program responsible for the minor. The candidate's Doctoral Committee must approve the minor program.

Language or Communications Requirement.

Candidates for the Ph.D. degree must satisfy Option A or Option B (below) before taking the comprehensive examination. The candidate's committee must approve the choice of option and courses. These credits may not be used elsewhere in the student's program.

Option A - Competence in reading, writing, and speaking one foreign language at the level normally attained by completing at least eight credits of undergraduate course work in a language approved by the committee. The candidate must earn at least a B grade in the final course of a language sequence. They also may meet the requirement by passing the course examination with a grade of B or better. Satisfactory completion of the 121G, 122G series of courses where offered by a language department, shall be deemed as satisfying Option A.

Option B - Complete nine credits in communications skills (e.g., agricultural education, English, speech communication, journalism) above the introductory level. A grade of at least B must be earned in the series 1-399; the minimum acceptable grade in the 400-499 series is C.

A candidate whose native language is not English must satisfy the Graduate School requirement regarding competence in English. At the discretion of the candidate's committee, such a student may be deemed to have satisfied the foreign language requirement on the basis of his/her native language and English proficiency. However, depending upon the professional requirements of the field, the committee may elect to require proficiency in an additional language or communications as specified in Option A or B (above).

Comprehensive Examination. This examination may be taken only after completion of the language or communication requirements, and after the candidate has substantially completed required course work. Candidates are required to have a minimum grade point average of 3.0 for graduate courses completed at this University at the time the comprehensive examination is taken.

The examination is officially scheduled and announced by the dean of the Graduate School upon recommendation of the Doctoral Committee. It will include both written and oral phases and will be administered by the candidate's Doctoral Committee. The oral phase will have two parts; one consisting of a departmental seminar and the second part will be an oral discussion/presentation to the Committee. The candidate will be expected to demonstrate a high degree of competence in his/her specialty, in related areas, and in the solution of research problems. A favorable vote of at least two-thirds of the members of the committee is required for passing. Based on the candidate's performance in the examination, the committee may recommend to the dean one of the following actions:

- 1) The candidate is passed, with no reservation, or subject to fulfillment of certain conditions.
- (2) The candidate will be re-examined at a later date.
- (3) The candidate is disapproved unconditionally for the degree.

Students must be registered, credit or noncredit, (Thesis Preparation 601 or 611) continuously each semester (excluding summers) beginning with the semester following the passing of the comprehensive examination and continuing each semester until the final oral examination is passed. However, students must be registered the semester of both the oral comprehensive examination and the final oral examination-even if taken during Summer Session.

Thesis. The thesis shall be written in a form acceptable to the Graduate School and the Graduate Program in Animal Science. The thesis will be in a technical and grammatical form that is acceptable to the student's committee. The committee may require the candidate to employ the services of a technical editor (at the candidate's expense) to aid the candidate to bring the paper into conformity. The thesis shall present data, results, and conclusions forthcoming from a research problem selected in consultation with the candidate's committee. Upon completion of the thesis, the candidate shall present a public seminar on the research. The thesis shall be in a final and polished form prior to the oral examination. The thesis shall be defended in a final oral examination conducted by the Doctoral Committee, and must be approved by the committee if a degree is to be awarded.

The thesis notation and reference procedures, where not otherwise specified by the Graduate School, shall be in the form and style of a recognized scientific journal. One acceptable copy of the thesis shall be submitted electronically to the Graduate School as required (www.gradsch.psu.edu/current/thesis.html).

Sufficient hard-bound copies shall be prepared to provide one copy each to the program, the advisor, and the co-advisor (if applicable). Good quality electrostatic reproductions are acceptable. These copies shall be produced at the candidate's expense.

If an additional copy is required for a granting agency, the appropriate department will pay.

Manuscript. The candidate shall prepare one or more manuscripts based on his/her thesis research in a form suitable for publication in an appropriate refereed scientific journal. The manuscript(s) shall be prepared and submitted according to guidelines established by the Graduate Program in Animal Science.

Final Oral Examination. A doctoral candidate who has satisfied all other

requirements for the degree will be scheduled by the dean of the Graduate School, on the recommendation of the Doctoral Committee to take a final examination. The final examination must be scheduled with the Graduate School at least two weeks before the examination is to be held. The final examination may not be scheduled within three months of the comprehensive examination unless the Dean of the Graduate School grants permission. The deadline for holding the examination prior to Commencement is listed in the Graduate School calendar. The examination is oral, open to the public, and related in large part to the thesis, but it may cover the whole field of study of the candidate without regard to courses that may have been taken here or elsewhere. A favorable vote of a two-thirds majority of the members of the committee is required for passing. The results of the examination are reported on a form provided by the Dean of the Graduate School and will be entered upon the candidate's official record. If a candidate fails, it is the responsibility of the Doctoral Committee to determine whether another examination may be taken.

II. Additional Degree Requirements

All graduate degree candidates shall assist in teaching at least one course. This teaching requirement will be met by completing one credit of AN SC 496A (Teaching Assistant) or AN SC 602 (Supervised Experience in College Teaching). Prior to assisting with a course for credit, students are encouraged to attend at least one teaching workshop provided for graduate students by the Instructional Development Program. International students whose native tongue is not English must attend a certification workshop prior to teaching.

All candidates shall complete committee-approved courses and fulfill requirements for the specific degree. Note: Colloquium credit is not given for the mandatory paper/thesis/dissertation defense seminar.

III. Minor in Animal Science

The Minor in the Graduate Program in Animal Science is for students majoring in other programs.

General. Candidates who pursue a minor in the Graduate Program in Animal Science must include at least one member of the graduate faculty from the Graduate Program in Animal Science on the Master's or Doctoral Committee.

At the Master's Level. Six credits in animal science/poultry science courses are required.

At the Doctoral Level. Fifteen credits in courses are required. At least six of those must be at the 500 level.

Summary of Graduate School Requirements for Ph. D. Candidates

Ph.D. candidates must meet the following requirements before the Office of Graduate Programs will approve their graduation. For more detailed information on these and other requirements, please refer to the Graduate Degree Programs Bulletin.

Note: These are Graduate School requirements only and do not include specific program/department requirements.

Residency

After passing the doctoral candidacy examination, students must be registered full-time for two semesters in a twelve-month period. This may include the semester of candidacy examination if it is taken during spring or fall.

A candidate for the Ph.D. degree must have satisfied the departmental communication and foreign language requirement (if applicable) before taking the comprehensive examination.

Three or more months must have elapsed between the passing of the comprehensive examination and the scheduling of the final oral examination.

The final oral examination must be held within six years of the date the comprehensive examination was passed. If more than six years have passed, a second comprehensive examination must be given before the final oral examination may be scheduled.

A student pursuing a minor must earn at least 15 graduate credits in that field. If courses other than those offered in the minor field are to be used, a listing of those courses must be submitted to the Office of Graduate Programs. Students pursuing a minor must have a representative from that field on their Doctoral Committee.

Continuous Registration

Students must be registered continuously each semester (excluding summers) beginning with the semester following the passing of the comprehensive examination and continuing each semester until the final oral examination is passed. However, students must be registered the semester of both the oral comprehensive examination and the final oral examination-even if taken during Summer Session.

Time Limitation

All requirements, including submission of the thesis, must be completed within eight years of the candidacy date.

No missing or deferred grades may appear on a student's transcript at the time either the oral comprehensive examination or final oral examination is scheduled.

Students must have at least a 3.0 (4.0 basis) grade point average to schedule an oral comprehensive examination or final oral examination and to graduate.

Guide for Thesis Preparation

This guide is intended to leave unchanged the instructions of the Graduate School. Information from the Graduate School concerning thesis preparation can be found in the Graduate Degree Programs Bulletin, this document and Thesis Guide. The following information can be found in the Thesis Guide: (1) format; (2) constraints on content; (3) subsequent publication; (4) submission of thesis; (5) vita. The Graduate Program in Animal Science requires the Curriculum Vita to be part of any thesis, not only Ph.D. theses.

This guide is intended to facilitate the graduate student's compliance with requirements of the Graduate Program in Animal Science that, "The student shall be required to prepare a manuscript(s) based on the thesis research results in a form suitable for publication in a scientific, refereed journal." Two acceptable formats are presented. The first follows closely the format of the Graduate School. The second may be preferred by one who anticipates submission of one or more manuscripts for publication in a scientific journal.

This guide is designed to make extensive revisions of tables and figures unnecessary in the submission of manuscripts to scientific journals, while ensuring compliance with Graduate School requirements. To facilitate review by the thesis committee, the name of the journal to which submission of manuscripts is anticipated should be provided with the thesis to the student's committee. A typical table of contents for a thesis in Animal Science is shown below:

TABLE OF CONTENTS	
Abstract.....	iii
List of Tables.....	v
List of Figures.....	viii
Acknowledgments.....	ix
I. Introduction.....	1
II. Historical Background.....	8
III. (Main Body of Thesis-choose either Option A or Option B)	22
Option A	
Materials and Methods	
Results	
Discussion	
Summary and Conclusions	
Option B	
1. (Title of first manuscript; e.g., The Effect of Ration Dilution on Energy Metabolism)	
Abstract	
Introduction	
Materials and Methods	
Results and Discussion (These sections may be combined as appropriate.)	
2. (Title of second manuscript; e.g., <i>Insulin-like Growth Factors in Milk</i>)	
Abstract	
Introduction	
Materials and Methods	
Results and Discussion (These sections may be combined as appropriate.)	
3 (Repeat format of first and second papers for additional papers as appropriate.)	
4. General Discussion (to integrate two or more papers).	
IV. BIBLIOGRAPHY	
V. APPENDIX (as appropriate)	
A. Experimental procedures, flow sheets, applications, and implications	
B. Experimental design and data	
VITA (no longer than one page)	

Parts of the thesis are discussed here in the order presented in the Table of Contents, outlined as general subdivisions. If the thesis contains two or more "papers" for submission to a scientific journal(s), as shown for III-Option B, it should contain an integrated discussion. The material from this section may be taken from the thesis essentially intact, and when appropriately supplemented with bibliographies, submitted to a scientific journal for publication. At the same time, the Introduction, Historical Background, General Discussion, Bibliography, and Appendix apply to the thesis as a whole. In particular, the sections of the thesis will be prepared to meet the following requirements:

Specific Parts of the Thesis

I. Introduction: This section will constitute a clear, concise statement of the overall problem area(s) investigated, the origin of the problem(s), the relation of the dissertation research to previous investigations, and the theoretical and/or practical importance of the research.

II. Historical Background: An exhaustive review of the literature, regardless of which optional format is selected, is required here. It is recommended that references in this and other sections of the thesis be entered by author name(s) and year (rather than by number) to facilitate proofreading and revision. If necessary, substitution of reference numbers for author and year can be accomplished quite easily prior to submission of a manuscript to a journal which requires such a format. Of necessity, this review will be more extensive than one acceptable to the editor of a scientific journal. Therefore, condensing of this section usually will be necessary for those selecting Option A prior to submission of a manuscript to a journal. If the thesis is to have utility within the Program, College, and University, the literature cited must be extensive enough to allow subsequent graduate students and staff members to use the thesis as a point of departure for future research. This review may then lead to an exposition of the present status of the problem, the place of the thesis problem(s) in the area of research, and the contribution that will be made by solution of the problem(s) posed.

III. Option A: This section includes the materials and methods for the thesis research, results, and discussion. Materials and Methods should be concise and detailed

enough to meet the requirements of the intended scientific journal(s). The more comprehensive and precise details of procedure, derivations of relationships, flow sheets of processes, and other supporting documents belong in Appendix A. Results and Discussion should be complete, concise, and cover the entire thesis. Undue speculation should be avoided. Summary and Conclusions simply summarizes the research findings and indicates their significance.

III. Option B: This section should constitute, respectively, manuscript 1, manuscript 2, etc., and as such should be complete when supplied with an individual Literature Cited section. Each manuscript should be arranged in the format of a selected journal to which submission is anticipated. Once chosen, this format will apply to all manuscripts included in the thesis. Abbreviations and terms used should conform to those used by the intended journal. Generally (see outline), the Abstract comes first, followed by the Introduction, Materials and Methods, and Results and Discussion sections. The Abstract is a brief synopsis of the procedure, results, and significance of the study. The Introduction should be brief and appropriately detailed to deal with the specific problem area(s) of the individual "paper." Materials and Methods should be concise and sufficiently detailed to meet the requirements of the intended scientific journal. The more comprehensive and precise details of procedure, derivations of relationships, flow sheets of processes, and other supporting documents should be placed in Appendix A. The Results and Discussion should be complete, concise, and relevant to the particular manuscript.

General discussion is intended to integrate the findings of two or more research investigations and to afford the candidate the opportunity to express some thoughts as to the implications of this work and to speculate on future applications-in short, to expound in a way generally considered inappropriate for journal articles.

IV. Bibliography: The object here is to achieve maximum utility for readers of the thesis. Abbreviations of names of journals and format of bibliography listings should be those used by the journal to which the manuscript(s) will be sent. Only those references cited in the text should be part of the bibliography.

V. Appendix: The Appendix is the repository of additional information as required by the committee, for example:

A. The experimental procedures, derivation of equations, flow sheets of sample treatment, applications and implications of the overall work, and any other items too

voluminous for inclusion in the main body of the thesis, but vital to a person desiring to repeat, verify, or extend the work.

B. An appropriate record of experimental design and all raw data collected but not included elsewhere in the thesis. Such a record might include tables for statistical analysis, standard deviations or standard errors associated with observed mean values, or the number of observations represented by a mean value, so that one would be able to take the data of the Appendix and independently calculate the data presented in tables in the body of the thesis. In some cases, the candidate may wish to include computer printouts of data as pocket material in the thesis (see Thesis Guide).

Semester Schedules for Degree Progress

Master of Professional Studies

It is the responsibility of each Master of Professional Studies candidate to accomplish the following objectives (assumes that the student carries 12-15 credits of course work per semester):

Prior to First Semester

- (1) Identify a general area of study interest.
- (2) Identify an academic advisor.

First Semester:

- (1) Take formal coursework. Credit load may vary depending on time commitment to teaching or research.
- (2) Take AN SC 590, Colloquium (Fall)
- (3) Attend Graduate Program in Animal Science seminars and other seminars.
- (4) Become familiar with departmental programs.
- (5) Develop a plan of study in conjunction with advisor.
- (6) Begin to identify M. P. S. paper topic in conjunction with advisor.
- (7) Establish and convene Advisory Committee by mid-semester and decide on a M. P. S. paper topic, finalize course work schedule, and begin work on the M. P. S. paper.

- (8) Determine opportunities for field experiences relative to student's interest in conjunction with advisor and perhaps extension specialist(s).

Second Semester

- (1) Take formal coursework.
- (2) Take AN SC 500, Readings in AN SC
- (3) Attend Graduate Program in Animal Science seminars and other seminars.
- (4) Assist in teaching (AN SC 496A or AN SC 602).
- (5) By the end of the second semester the M. P. S. paper should be essentially complete and ready for review by the committee.
- (6) Continue obtaining field experience in area of M. P. S. paper or particular interest.

Summer

- (1) Participate in technical meetings as appropriate.
- (2) Graduate.

Semester Schedules for Degree Progress

Master of Science

It is the responsibility of each Master of Science candidate to accomplish the following objectives:

Prior to First Semester:

- (1) Identify a general area of study interest.
- (2) Identify an academic and research advisor, usually the same faculty member.
- (3) Take AN SC 500, Readings in AN SC
- (4) Schedule Student Advisory Committee meeting early in semester to discuss and develop specific thesis topic and a plan of action for its completion, and discuss progress made in course work and any courses the committee feels should be taken by the candidate.

First Semester

- (1) Take formal coursework. Credit load may vary depending on time commitment to teaching or research.
- (2) Take AN SC 590, Colloquium (Fall)
- (3) Attend Seminars of the Graduate Program in Animal Science and other seminars.
- (4) Become familiar with departmental programs.
- (5) Establish and convene the Student Advisory Committee to plan courses to be taken during the degree program.
- (6) Develop a plan of coursework in conjunction with advisor and committee.
- (7) Identify an area of thesis research interest in conjunction with advisor.
- (8) Determine opportunities for field experience relative to research interests in conjunction with advisor and perhaps extension specialist(s).
- (5) By the end of the second semester a detailed thesis research proposal should be completed and submitted to the Student Advisory Committee. It should include a concise literature review, statement of hypothesis, objectives, and procedures.
- (6) Begin working on thesis research as early as appropriate.

Summer-Third Semester

- (1) Conduct research
- (2) Participate in scientific meetings as appropriate.

Fourth Semester

- (1) Take formal coursework.
- (2) Attend Graduate Program in Animal Science seminars.
- (3) Take AN SC 590, Colloquium (Fall)
- (4) Continue thesis research. Determine journals and other media most appropriate for publishing findings of research.
- (5) Assist in teaching (AN SC 496A or AN SC 602).

Second Semester

- (1) Take formal coursework.
- (2) Attend Graduate Program in Animal Science seminars and other seminars.

Fifth Semester

- (1) Continue formal coursework as required to complete plan of study.
- (2) Attend Graduate Program in Animal Science seminars and other seminars.
- (3) Complete thesis research.
- (3) Present formal seminar on thesis research
- (4) Graduate.

Summer-Sixth and Final Semester

- (1) Write thesis and prepare final draft (from thesis) of journal article(s) and other types of publications as appropriate.
- (2) Schedule final oral examination with committee.

Additional Information

During the summer, students are expected to pursue thesis research and participate in regional or national scientific and technical meetings as appropriate. Students are expected to attend program seminars and Graduate Program in Animal Science seminar during the fourth or fifth semester are encouraged to attend other seminars that are of interest.

Students who entered the program before fall semester 1999 are expected to prepare and deliver a Graduate Program in Animal Science seminar during the fourth or fifth semester.

Semester Schedules for Degree Progress

Doctor of Philosophy

It is the responsibility of each candidate for the PhD degree to accomplish the following objectives:

Prior to First Semester

- (1) Identify academic/research advisor.

First Semester:

- (1) Take formal coursework. Credit load may vary depending on the time commitment to teaching or research.
- (2) Attend Graduate Program in Animal Science seminars and other seminars.
- (3) Take AN SC 590, Colloquium (Fall)
- (4) Take AN SC 502, Scientific Scholarship
- (5) Establish and convene the Advisory Committee and develop a plan of study for the degree program.
- (6) Identify potential areas for thesis research.
- (7) Determine opportunities for field experience relative to research interests in conjunction with advisor and perhaps extension specialist(s).

Second Semester

- (1) Take formal coursework.
- (2) Attend Graduate Program in Animal Science and other seminars.
- (3) Take AN SC 590, Colloquium
- (4) Take AN SC 500, Readings in AN SC
- (5) Schedule and complete candidacy examination. (Candidates for the Ph.D. without the M.S. degree should schedule the candidacy examination after 18 credits have been completed).
- (6) Identify areas of research that will be addressed in the thesis research proposal.

Summer

- (1) Conduct research
- (2) Establish a Doctoral Committee. Discuss coursework taken and proposed courses with committee.

Fourth Semester

- (1) Take formal coursework/research credits.
- (2) Attend Graduate Program in Animal Science seminars and other seminars.
- (3) Take AN SC 590, Colloquium (Fall)
- (4) Take AN SC 500, Readings in AN SC
- (5) Assist in teaching (AN SC 496A or AN SC 602).
- (6) Write a detailed proposal for research to be undertaken. Submit proposal to Doctoral Committee. In conjunction with input from committee, finalize objectives of research, methods of procedure, and begin thesis research as early as possible.
- (7) Prepare for comprehensive examination.

Fifth Semester:

- (1) Finalize formal coursework as required to complete plan of study.
- (2) Attend Graduate Program in Animal Science seminars and other seminars.
- (3) Take AN SC 590, Colloquium
- (4) Continue thesis research.

- (5) Schedule and complete comprehensive examination.
- (6) Inform Doctoral Committee of progress and problems with research.

Summer

- (1) Conduct research

Seventh and Subsequent Semesters

- (1) Complete thesis research.
- (2) Attend Graduate Program in Animal Science seminars and other seminars.
- (3) Take AN SC 590, Colloquium (Fall)
- (4) Write thesis and prepare manuscript(s) for submission to scientific journal(s).
- (5) Schedule and complete final oral examination.

Additional Information

During summer, students are expected to pursue thesis research and participate in regional and national scientific and technical meetings as appropriate. Students are expected to attend all program seminars and other seminars that are of interest.

Services and Supplies

General Information:

The fundamental determining factor for use of department supplies and services should be if the need or purpose is for Official University business, the department will provide the necessary inputs. If the need or purpose is for your personal use, class work, or thesis work, the department will not provide the input.

Here are a few specific examples to illustrate the guidelines:

- (1) No University (department) resource (e.g. telephone, paper, supplies, notebooks, copier) shall be used for personal business (on a limited scale, the department's photocopiers can be used for non-University business on a fee-for-service basis).
- (2) Paper supplies (e.g., notebooks, pencils, pens) from the stockroom are not to be used for classes you are taking. The department will provide paper and forms for recording and analysis of thesis research data because the data belong to the University.
- (3) The photocopiers in the Departments of Dairy and Animal Science offices (Agricultural Sciences and Industry Building, Henning Building, Almquist Research Center) and Poultry Science (Henning Building) are not to be used to copy classwork or items for personal use—such as class notes, journal or magazine articles, or parts of books—unless reimbursement is made to the department. Copying done at Pattee Library for similar purposes should not be billed to the department or charged on department copy cards.
- (4) The same general guidelines as in (2) and (3) apply to secretarial help. Typing of all drafts of your thesis is personal business. Any work to be done by staff assistants must be arranged by and handled through your advisor.

(5) Handout outlines and visual aids for seminars can generally be considered department business, but arrangements should be made through the faculty member-in-charge.

(6) As a courtesy and privilege, the department makes available one or more personal computers for use by students. Typewriters and personal computers at secretarial desks are for secretarial use only.

Procedures for Obtaining Keys

The security of facilities and equipment is the responsibility of all members of both departments. With departmental laboratories and offices located in several buildings through which many people pass daily, it is important to realize the importance of locking the doors to unoccupied offices and laboratories. This is for the security of valuable equipment and supplies, as well as the safety of individuals. Any laboratory facility in which radioactive materials are stored must be locked when unoccupied.

Graduate students are entitled to hold keys for the main entrance of the building in which their offices are located, as well as their offices and laboratories. These keys may be obtained through the department's administrative assistant in 324 Henning Building (Dairy and Animal Science) or 215 Henning Building (Poultry Science). A deposit is required for each key. In certain situations, individuals may need access to other offices or laboratories. If such situations arise, the student should contact the faculty member supervising the laboratory for approval to obtain a key. This practice should be kept to a minimum. Individuals must return all keys upon terminating association with the department and should help maintain security by avoiding unnecessary lending of keys to others.

Procedures for Parking Permits

Graduate students are required to register any motor vehicle or bicycle used on campus. Students may register their motor vehicles and

obtain parking permits from the Parking Office, Eisenhower Parking Deck. Bicycles should be registered with the Department of University Safety, Eisenhower Parking Deck.

Availability of Services and Supplies to Graduate Students in the Program

Resources Available on Campus

Statistical Consulting Service-Assistance with statistical analyses, experimental design. Both College of Agricultural Sciences statisticians and the Penn State

Statistical Consulting Service are available for statistical consulting. The student should arrange such assistance with the aid of his/her advisor.

Many other resources are available, such as health services and insurance. The student should consult the front of the faculty/staff telephone directory or contact the Graduate School Information Center (865-5436) for information.

Graduate Application Materials

Graduate Program in Animal Science

The [Graduate School](#) accepts only online applications.

Once you have completed and submitted the Animal Science Supplemental application below (<http://www.das.psu.edu/graduate/pdf/animalsciencegradappv2.pdf>) follow these instructions:

Mail the following document to: Dr. Daniel Hagen, Graduate Officer, The Graduate Program in Animal Science, 324 Henning Building, The Pennsylvania State University, 16802-3503:

- Two official transcripts from all institutions of higher institutions attended, both undergraduate and graduate. International applicants must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.
- GRE scores
- TOEFL score (only for students whose native language is not English; see details on page 7)
- Application for Visa Document (International Students Only)
- Three letters of recommendation (online submission available)
- Statement of long-term plans and career goal

Application for the Graduate Program in Animal Science at The Pennsylvania State University

Your Name (Last): _____ (First): _____ (Middle Initial): _____

Social Security Number: _____

Seeking Admission:

Year:

Semester (Spring, Summer, **Fall [usual entry semester]**):

Degree Sought (M. Agr., M.S. or Ph.D.):

Are you a U.S. Citizen? _____ If not, what is your status or resident alien number? _____

Have you previously applied for admission here? _____ For what year? _____

Date graduated from High School: _____

GRE Scores: Verbal _____ Quantitative _____ Analytical _____ Date Taken _____

Total TOEFL Score (international applicants) _____ Date Taken _____

Provide current (e.g., school address) and permanent address, if different. Please indicate to which address you would like correspondence about your application sent.

Current Address (if different from above):

Mail materials to this address -

Yes ___ No ___

Street: _____

Apartment: _____

City: _____

State: _____ Zip code: _____

Country: _____

Telephone # at this address: () _____

Have you been employed while in college? _____

Briefly, describe job and hours worked:

Permanent Address (if different from above):

Mail materials to this address -

Yes ___ No ___

Street: _____

Apartment: _____

City: _____

State: _____ Zip code: _____

Country: _____

Telephone # at this address: () _____

Have you been employed during the summer while not in college? _____

Briefly, describe jobs and hours worked:

List nonacademic activities in which you participated during your college years:
 Current employment or activity, if not in college:

Has your education ever been interrupted?
 If so, why?

Have you ever been asked to withdraw from school? ____ *Yes* _____ *No*

For academic performance? ____ For disciplinary action? ____ Health? ____ Other?

Have you ever attended any graduate or veterinary school? (Yes/No) _____

What degree program? _____ Dates Attended: _____

Completed? _____ (Yes No)

Where? _____

Have you previously applied or are you currently applying to any of the following schools?

Type of School	Year	School
Graduate		
Veterinary		
Other		

Cumulative Science Average: B.S. _____ Post B.S. _____ (if applicable)

REFERENCES:

Please provide us with the names, addresses and phone numbers for those whom you have asked to provide references (in the space provided below).

1. NAME: _____

POSITION OR AFFILIATION: _____

ADDRESS: _____

TELEPHONE NO.: _____

E-MAIL: _____

2. NAME: _____

POSITION OR AFFILIATION: _____

ADDRESS: _____

TELEPHONE NO.: _____

E-MAIL: _____

3. NAME: _____

POSITION OR AFFILIATION: _____

ADDRESS: _____

TELEPHONE NO.: _____

E-MAIL: _____

This form may be saved and uploaded with our Penn State Graduate Application materials or mail to:

Dr. Daniel Hagen
Graduate Officer, Graduate Program in Animal Science
The Pennsylvania State University
324 Henning Building
University Park, PA 16802-3503