Master in Animal Sciences Handbook
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INTRODUCTION

This document presents the policies of the Department of Animal Sciences that relate to graduate students who will pursue a Master in Animal Sciences (MAS) degree and is intended to supplement the Graduate School Handbook of The Ohio State University. Policies established in that handbook will be referenced when appropriate and therefore are not repeated in this Handbook. Students pursuing a Masters in Science (M.S.) degree or a Doctor of Philosophy (Ph.D.) degree in Animal Sciences should refer to the Graduate Program Handbook of the Department of Animal Sciences.

STATEMENT OF GOALS

The mission of the graduate program is to train intelligent and highly motivated students to become highly proficient contributors to society throughout their careers. The attributes necessary to achieve this goal are instilled in various ways. Basic knowledge of the sciences and their application to questions regarding function, management, and use of animals is imparted in formal courses offered both within the Department of Animal Sciences and in other departments offering relevant graduate level courses. Through coursework, the students are required to develop the necessary depth in their given discipline of study and are also encouraged to acquire breadth in their understanding of the field of animal sciences to properly prepare them for careers in this field.

Growth and versatility of students as scientists are fostered by interactions among peers, with faculty, and with industry personnel. Opportunities are given to students to hone their abilities to communicate effectively. All students are required to prepare and deliver seminars. Many of the graduate level courses in the Department require the writing of extensive papers and presentation to other students enrolled in the course. All are required to demonstrate their knowledge and competence in their chosen field of study, while thinking critically about the issues and challenges of the animal industry through writing.

Appropriate ethical behavior and the ability to make appropriate decisions regarding ethical matters are conveyed primarily by the example set by faculty. However, such training is also conveyed more explicitly in formal and informal meetings between faculty and students and in portions of formal courses offered by the Department.

PROFESSIONAL DEGREE

The MAS program aims to provide an applied, non-thesis degree for students having completed a BS and industry professionals who have a BS degree. For recent BS graduates, the program is aimed at individuals who wish to increase their knowledge and competence at the graduate level in preparation for entering industry, attending professional school, or becoming an academic or outreach educator. The program is not structured for individuals seeking a research career in academia. The MAS program also serves working industry professionals who want to gain new knowledge concerning recent advancements in various subjects of animal sciences to promote their careers and fulfill continuing education needs.

The MAS offers a learning environment that is supportive of the applicant’s career intentions. Flexibility of courses that emphasize Animal Sciences principles, business, communication, education, etc. is an important component of the program.

Learning Goals

Students completing this program are expected to be able to:
1. Gain foundational knowledge in the fundamental sciences as it relates to animal sciences
2. Understand and apply the scientific method in the animal sciences research areas
3. Demonstrate effective communication
4. Obtain professional skills from experience working directly with animal science professionals
5. Recognize and demonstrate the diversity of animal sciences

APPLICATION, ADMISSION, REGISTRATION, SCHEDULING

Admission Requirements

Admission to the Department of Animal Sciences Graduate Program is selective. Applicants must meet the admission requirements and follow the application procedures outlined below.

To be considered for admission, students must have earned a baccalaureate or equivalent degree from an accredited college or university in Animal Sciences or a related area by the expected date of entry. A minimum of a 3.0 cumulative point-hour ratio (4.0 scale) in all previous coursework is required. Furthermore, the transcript must reflect sufficient background to be eligible to pursue graduate level courses. Applicants whose transcripts do not support sufficient background may be required to complete remedial courses for eligibility. An additional requirement for international applicants includes a minimum score of 79 on the internet-based Test of English as a Foreign Language (TOEFL; 550 on the paper-based TOEFL), 82 on the Michigan English Language Assessment Battery (MELAB), or 7.0 on the International English Language Testing System (IELTS). This requirement applies only to applicants from a country where the first language is not English unless a bachelor’s degree or higher was earned in an English-speaking country. Students not meeting these requirements may be considered for conditional admission. Meeting these minimum criteria does not guarantee admission into the program.

Prospective students must apply to the University Graduate School on-line through the OSU Graduate Admissions Office (https://gpadmissions.osu.edu/grad/steps-to-apply.html). After a complete application is received, decisions regarding admissibility into the MAS graduate program are made through the Animal Sciences Graduate Studies Committee (GSC).

Advisory Committee

Students will enter the program under the advisement of an Animal Sciences faculty advisor for the MAS Program. The MAS examination committee is composed of at least two Graduate Faculty members (one of which is the advisor). The other committee members in addition to the advisor must hold the category M or P status but do not have to reside within Animal Sciences. A MAS student may consider having a third committee member outside of the OSU community who is a professional in the industry. Additional non-Graduate Faculty members may be appointed to the examination committee upon approval by the Animal Sciences GSC and petition to the Graduate School.

The MAS program is not intended to replace the traditional MS option currently offered by the Department. Lateral transfer between the MAS and MS programs is only permissible under special circumstances and must be approved by the Animal Sciences GSC. In the instance that a student in the MAS program would decide to pursue the MS program, or vice versa, the student would be required to submit an Intra-University Graduate Transfer Application on the Admissions Website. The Department of Animal Sciences GSC will approve or deny the requested transfer between programs. A maximum of 10 credit hours (can include 1 credit hour of ANIMSCI 888X) in which the student has earned a minimum grade of “B” are permitted for transfer to the desired program. Credit hours earned as ANIMSCI XX93 cannot be transferred between the two master’s programs. MAS students are required to enroll in 3 credit hours of ANIMSCI 8997 Graduate
Writing Experience in Animal Sciences.

Registration & Scheduling
(Section III - Graduate School Handbook)

Transfer Credit

Graduate credit hours earned at another university may be transferred to the MAS program. However, there are limitations and restrictions on the number of credit hours that can be transferred. The following minimum conditions must be satisfied to transfer graduate credit hours:

1. Letter graded; graduate credit hours were earned as a graduate student at an accredited university within the last five years.
2. A minimum grade of "B" or satisfactory was earned in each course to be transferred.
3. The GSC approved the transfer.

At least 80% of the required credit hours must be completed at Ohio State over a two-semester period.

Curriculum

The curriculum requires a minimum of 30 credit hours of semester-based instruction, a writing experience (in the form of a comprehensive written exam, professional project, research proposal, or culminating paper), industry experience, and a seminar. Students must complete their program with a minimum of 30 credit hours. Students are required to complete a set of required courses: Nutrition core courses (12 credit hours), Physiology Core courses (3 credit hours), Introduction to Graduate Studies, Nutrition Research Ethics, one course in statistics, and one course in business. Seminar, a professional experience, and a writing experience will complete the hours. It is anticipated that some students will have completed some courses as an undergraduate in which case they will need to choose other courses from the list. The maximum number of ANIMSCI XX93 credit hours cannot exceed six hours. As the MAS degree is not designed as a research degree, MAS students are not eligible for credit from taking ANIMSCI 8998 or 8999.

Nutrition Core Courses (Choose at least 12 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Sciences 5031 Ruminant Nutrition</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 5032 Non-Ruminant Nutrition</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 5033 Feeding Management &amp; Records Analysis for Dairy Cattle</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 5070 Nutritional Immunology in Animal Systems</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 5090 Gut Microbiology</td>
<td>2 cr</td>
</tr>
<tr>
<td>Animal Sciences 5530 Comparative Animal Nutrient Metabolism</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 7030 Advanced Topics in Ruminant Nutrition</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 7761 Macronutrient Metabolism</td>
<td>4 cr</td>
</tr>
<tr>
<td>Animal Sciences 7762 Micronutrient Metabolism</td>
<td>4 cr</td>
</tr>
</tbody>
</table>

Subtotal 12

Physiology Core Courses (Choose 3 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Sciences 5100 Advanced Growth and Development</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 6060 Advanced Reproductive Physiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 7040 Animal Physiology I (DL)</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 7050 Animal Physiology II (DL)</td>
<td>3 cr</td>
</tr>
<tr>
<td>Animal Sciences 7100 Advanced Growth and Development</td>
<td>3 cr</td>
</tr>
</tbody>
</table>

Subtotal 3
Required Courses
Animal Sciences 6000 Introduction to Graduate Studies in Animal Sciences 1 cr
Animal Sciences 7789 Nutrition Research Ethics 1 cr
Subtotal 2

Required Business Course Options (Choose One)
AEDE 5330 Benefit-Cost Analysis 3 cr
AEDE 5900 Food Systems Planning and the Economy 3 cr
Subtotal 3

Statistics (Choose One)
Statistics 5301 Intermediate Data Analysis 1 4 cr
Horticulture and Crop Science 5887 Introduction to Experimental Design 3 cr
Animal Sciences 7000 Applied Biometrics 4 cr
Horticulture and Crop Science 8887 Experimental Design 4 cr
Subtotal 3-4

Professional Experience
Animal Sciences 6193 3 cr
Subtotal 3

Writing Experience
Animal Sciences 8997 Graduate Writing Experience in Animal Sciences 3 cr
Subtotal 3

Seminar
Animal Sciences 8881 General Seminar 1 cr
Subtotal 1

TOTAL (minimum) 30

Academic Standards
Students must meet the minimum 3.0 cumulative grade point average and reasonable progress towards the requirements outlined in the Graduate School Handbook, Section V.1. The GSC will periodically review grades and progress.

Permanent Record
The Department of Animal Sciences maintains a confidential file on each graduate student. This file contains: 1) letters of recommendation and the previous transcripts, 2) courses taken and grades earned, 3) seminars given, 5) examination committee approval, 6) approved culminating paper proposal, 7) proposed plan of study and expected completion date, 8) annual evaluation reports, and 9) final examination results.

Professional Experience
An independent project or internship must be completed in the student’s area of interest. This can occur during a very focused period of time or over an extended period of time. Projects may be with industry, government agencies, non-profit organizations, or with faculty in the Department of Animal Sciences.
Students are expected to gain practical, hands-on experience through an internship, independent study, mentored Extension experience or a mentored teaching experience. The project and its scope must be approved by the faculty advisor. The project must have a minimum of 250 work hours, of which a minimum of 80 hours of direct engagement with their mentor are required. Students can use current industry experience to contribute towards their 80 direct hours. The student will register for ANIMSCI 6193 during or after the experience and the faculty advisor will decide on the expectations for completion of the experience for the course credit, e.g. reflection report (oral or written) or presentation. The industry mentor will also complete an evaluation of the student (Appendix X) to be placed in the student’s file.

**Writing Experience and Final Examination**

Each student must pass a final examination that is intended to evaluate the student’s proficiency and understanding of his/her field of study and has a significant writing component. Regardless of final exam format (described below), completion of the final examination is reflected through a satisfactory grade in ANIMSCI 8997. Students must enroll in at least 2 credit hours of ANIMSCI 8997 during the term of expected graduation. Evaluation of the final examination is required of all members of the student’s examination committee, and unanimous approval (satisfactory) of the final examination by the examination committee is required. Students must adhere to all published Graduate School deadlines for graduation.

The final examination may take one of the four formats that provides a student an opportunity to showcase their knowledge and competence in their field of study, while thinking critically about the issues/situations that can be challenging to the industry. These are as follows:

1. A comprehensive written examination that is given during the last term of the MAS program. Each committee member contributes questions for the exam, with the exam expecting to take between 4 to 8 hours to complete.

2. A professional project that will be detailed in a written report and may include the development of Extension or outreach related materials, the development of educational materials and teaching of a course, industry research, a special project, or internship. Additional scholarly and developmental activities in this regard can be considered and must be approved by the student’s committee.

3. A literature review or final paper. The culminating paper covers a topic relevant to the student’s field of specialization. The contents and length of the paper must be agreed upon between the student and their advisor.

4. A research proposal which should be consistent with a published Request for Proposals from a funding entity (such as CFAES Internal Grants Program) and in the student’s field of specialization.

These alternative options for the final examination may be completed at any point during the student’s program and on the student’s own schedule, but evaluation of the final exam, project, paper, or proposal will be performed during the final term of the program, and the performance is denoted by the grade received in ANIMSCI 8997 during this term. For students choosing the written exam, the oral exam (one hour in length) with all committee member present must be held within one to two weeks after completion of the written exam. For students who choose options two through four, the expectation is that they will present an exit seminar based upon their work that is followed by an oral exam (one hour in length). Regardless of the format chosen for the final examination, this exercise must involve analysis and synthesis of existing knowledge to explore a question or understand a current issue in animal sciences. Likewise, the
final exam should consider the relevance of the work to their field of study, a discussion of what is not known in the area, and a presentation of future implications for the field. Ultimately, the examination committee is responsible for determining the appropriateness of the selected examination format.

Communication

Graduate students are required to be included in the Animal Sciences graduate student listserv. Important information is distributed via this route. To activate your OSU Internet Username and create a password, go to: www.oit.ohio-state.edu and click on “Activate OSU Internet Username” then follow the prompts. An OSU Internet Username takes the form lastname.#.

GENERAL EXPECTATIONS

All graduate students are encouraged to participate in activities beyond those directly related to their graduate coursework program. Such activities include seminars, clubs, committees, Extension education and other forms of activities that support Departmental missions.

Health and Safety

Students in the MAS program who are involved, even peripherally, in research are required to complete all lab safety and animal handling training.

Seminars

All MAS students are required to give one seminar, usually as part of the ANIMSCI 888X seminar series. For students that choose a final examination format other than the comprehensive written examination, one exit seminar is also required.

Forms

Most forms referred to in this document can be found at: https://gradsch.osu.edu/

GRIEVANCE PROCEDURE

A student should make every effort to resolve disputes with the party(ies) involved. If this is not possible, a written appeal can be submitted to the GSC through the grievance procedure described in this document.

Please review the grievance procedure before the need arises. Cooperation and communication are required on all sides to avoid unnecessary misunderstandings. The grievance procedure starts with a student's discussion with his or her faculty adviser. At each level of appeal, there are at least two possible results. The first, and most desirable result, is a faculty-student understanding, leading to a solution and thereby resolving the grievance. The second result provides a mechanism for the student to appeal to another party of higher authority that is further removed from the situation.

Levels of Appeal

1. Discussion with faculty adviser
2. Discussion between student and GSC chair
3. Presentation of grievance to entire GSC (either in person or in writing). A majority vote in the student's absence will determine a decision.
4. Appeal to the Department Chair (either in person or in writing)
5. Written appeal to the Department Chair's Advisory Committee
6. Department Chair and Student approach the Graduate School Dean

It is the Department’s sincere hope that all grievances can be resolved at the first step. When further steps are required, everyone involved should understand the steps to be taken so personal conflicts do not develop and decrease our ability to work together towards a solution. Conflicts, which persist, hurt everyone. Grievances must be worked out rapidly and to the satisfaction of all concerned. If some policy of procedure is causing low morale, we all suffer. Graduate student/faculty relations are very important for the overall productivity of the Department. We encourage constant communication between students and faculty. If there is free and open communication, many misunderstandings can be corrected before they become grievances. Refer to the Graduate School Handbook Appendix D.

THE GRADUATE SCHOOL AND THE DEPARTMENT OF ANIMAL SCIENCES

The Graduate School

See Section I of the Graduate School for information on the structure of the Graduate School and governance of graduate education. The Department of Animal Sciences graduate faculty is committed to maintain an outstanding program of graduate study operated through the GSC.

Graduate Studies Committee

The GSC chair must be a category P graduate faculty member (see below) elected by the faculty to serve a three-year term. Three additional graduate faculty members are elected by the faculty to serve three-year staggered terms. One member is re-elected or replaced each year. If a member of the GSC is elected as chair, a replacement will be elected to serve out the remainder of his/her term. The department chair or associate chair will serve as a voting member of the graduate committee. If the department chair serves as a voting member, the associate chair may also serve on the committee but as a non-voting member. The Director of the MAS program will also sit on the GSC as a non-voting member. One graduate student will be elected by the graduate students to serve a one-year term as a non-voting member of the GSC. Responsibilities of the GSC are spelled out in Section 13 of the Graduate School Handbook. A staff member will be assigned to coordinate graduate studies activities.

In addition to other duties mentioned in this document, the GSC will review course proposals or other curriculum issues related to the graduate program. Course proposals and other reviews will be forwarded to the Academic Affairs Committee and should include an assessment of how the proposal enhances the Animal Sciences graduate program. The Academic Affairs Committee will be responsible for the administrative aspects of the documentation and approval of these graduate courses.

Graduate Faculty Membership

The Graduate School at OSU determines requirements for Graduate Faculty status; Category M is necessary to mentor MAS and MS students; and Category P is required to mentor Ph.D. students (see Section of the Graduate School Handbook). The Graduate Faculty members of the Department of Animal Sciences
believe that the desire to counsel students as a mentor is an integral part of graduate faculty membership.

The qualifications for Category M status are that an individual holds a faculty appointment and a M.S. degree or equivalent or higher. The qualifications for Category P status are that an individual holds a tenure track faculty appointment, has an earned Ph.D. or equivalent, is engaged in an active program of research, or demonstrates significant promise of establishing such a program. The GSC confers Category M status and notifies the Graduate School of its actions.

Faculty members desiring Category P status are required to submit evidence of eligibility to the GSC. It is suggested that new faculty with a Category M status co-advise Ph.D. students prior to submitting this request. The candidate’s nomination materials will be made available to the entire Graduate Faculty of the Department for perusal and comment. The GSC will assess the materials submitted and consider faculty comments. If warranted, the GSC will make a nomination for Category P status to the Graduate School.

Faculty members with a courtesy appointment in the Department of Animal Sciences are eligible to be members of the Animal Sciences Graduate Faculty. To be granted Category M or P status in the Department of Animal Sciences, faculty with a courtesy appointment must have credentials consistent with those of regular faculty holding such appointments. The GSC appoints faculty with courtesy appointments to Category M graduate faculty status and notifies the Graduate school of its actions. Nomination materials for courtesy faculty that desire Category P status will be made available for review by the entire Animal Sciences Graduate Faculty. The GSC will assess the materials submitted and consider faculty comments. If approved, a nomination for Category P status will be forwarded by the GSC to the Graduate School. Students advised by courtesy faculty with graduate faculty status in the Department of Animal sciences are not eligible for Departmental associateships or fellowships, nor are they eligible for Departmental funds in support of travel to scientific meetings.

POTENTIAL GRADUATE FACULTY ADVISORS

Graduate faculty members with regular appointments in the Department of Animal Sciences are alphabetically listed. Following the faculty member's name are Graduate Faculty Category, the degree, institution, year of degree, research interest, location and rank (M for those who may advise MAS and MS students, and serve on Ph.D. committees, P for those authorized to advise Ph.D., MAS, and MS students).

Department Chair
- Pasha Lyvers Peffer, Ph.D. Interim Chair, North Carolina State University, 2004. Nutrition Department of Animal Sciences. (Columbus) M.

Associate Chair
- Eastridge, Maurice L., Ph.D., Purdue University, 1986. Dairy Nutrition (Columbus) P.

Graduate Studies Committee Chair
- Kinder, James, Ph.D., Washington State University, 1975. Reproductive Physiology (Columbus) P.

MAS Program Director
- Dr. Benjamin Wenner, Ph.D., Ohio State University, 2016. Ruminant Nutrition (Columbus) M.

Graduate Faculty
- Bielke, Lisa R., PhD., University of Arkansas, 2006. Poultry Microbiology (Wooster) P.
Boyles, Stephen L., Ph.D., Kansas State University, 1985. Beef Nutrition (Columbus) M.
Chiavegato, Marilia, Ph.D., Michigan State University. 2014. Grazing Systems. (Columbus) P.
Cole, Kimberly, Ph.D., University of Arkansas, 2005. Equine (Columbus) P.
Cressman, Michael, Ph.D., Ohio State University. 2014. Poultry (Columbus) M.
Eastridge, Maurice L., Ph.D., Purdue University, 1986. Dairy Nutrition (Columbus) P.
Enger, Benjamin, Ph.D., Virginia Polytechnic Institute and State University, 2018. (Wooster) P.
Ezeji, Thaddeus, Ph.D., (Magna Cum Laude) University of Rostock, Germany, 2001. Microbiology (Wooster) P.
Firkins, Jeffrey L., Ph.D., University of Illinois, 1987. Dairy Nutrition (Columbus) P.
Garcia, Lyda, Ph.D., Texas A&M University, 2010. Meat Science (Columbus) M.
Garcia Guerra, Alvaro, Ph.D. University of Wisconsin-Madison, 2017. Reproductive Physiology (Columbus). P.
George, Kelly, Ph.D. Ohio State University. Human-Animal Interaction (Columbus). M.
Gourapura, Renukaradyha, Ph.D. Indian Institute of Science, 2002. (Wooster) P.
Jacobi, Sheila, Ph.D., Purdue University, 2006. Nutrition (Wooster) P.
Kenney, Scott, Ph.D., Pennsylvania State University, 2008. Immunology, Virology. (Wooster) P.
Kinder, James E., Ph.D., Washington State University, 1975. Reproductive Physiology (Wooster) P.
Knipe, Lynn C., Ph.D., Iowa State University, 1982. Meat Science (Columbus) M.
Lee, Chanhee, Ph.D., Pennsylvania State University, 2012. Animal Science (Wooster) P.
Lee, Kichoon, Ph.D., University of Georgia, 1997. Molecular Biology (Columbus) P.
Pempek, Jessica., Ph.D., Ohio State University, 2015. Animal Welfare (Columbus) M.
Rajashekara, Gireesh, Ph.D., University of Minnesota, 1999. Microbiology & Immunology (Wooster) P.
Relling, Alejandro, PhD., The Ohio State University, 2009. Animal Sciences (Wooster) P.
Velleman, Sandra J., Ph.D., University of Connecticut, 1986. Cell and Developmental Biology (Wooster) P.
Vlasova, Anastasia, Ph.D., Ivanovsky Institute for Virology. Immunology & Virology. (Wooster) P.
Wick, Macdonald P., Ph.D., University of California, Davis, 1997. Muscle Cell Biology (Columbus) P.