Tuskegee University
College of Agriculture, Environment and Nutrition Sciences
Department of Agricultural and Environmental Sciences Master of Science (M.S.) in Animal Sciences

Contact Information:
Dr. Chuck Okere, Program Coordinator; cokere@mytu.tuskegee.edu ; Ph: +1 (334) 727-8094

Dr. Olga Bolden-Tiller, Head; obtiller@mytu.tuskegee.edu; Ph: +1 (334) 727-8403

Degree(s) Offered: Master of Science (M.S.) in Animal Sciences, Thesis and Non-Thesis Options

* For additional information please refer to the Graduate Handbook.

The Animal Sciences graduate program offers several specialty areas, such as **nutrition**, **parasitology, silvopasture, breeding and genetics, reproduction** and **biotechnology**, from which students can focus as a part of their course of study. Cattle, poultry, goats and a variety of other domestic and laboratory animals are available for research. This program is flexible in terms of research and course work so that students can achieve their career-inspired and individual objectives. Students complete a total of ~30 credit hours that include a research (thesis option) or professional project (non-thesis option). Find out more about the animal science research program in this area http://www.tuskegee.edu/academics/colleges/caens/caens_research_centersprograms/ap_sciences_research.aspx. Graduates of the program are successfully pursuing careers with government, academia, and industry in positions with emphases on animal production, animal nutrition, animal health, human health, food production, food safety, food quality and much more! Numerous graduates have also gone on to further their education in graduate programs, law school, and veterinary medicine at universities across the country.

Departmental Admissions Requirements:

- Applicants must have completed a B.S. degree from a department of approved standing and granted by an accredited college or university, preferably in animal sciences, biology, or a related area to be considered for the Master's program in Animal Sciences.
- Prerequisite academic work should provide evidence that the application shall be able to pursue the graduate course effectively.
- A cumulative GPA of 3.0/4.0 or better is required for regular admission; however, student with a cumulative GPA of 2.7-2.99/4.0 will be considered for conditional admittance.

University Admissions Requirements:

- Although it is required that applicants submit GRE scores to complete the admissions application, no minimum is required.
- Official Transcript from all colleges/universities attended (International Students must have transcripts translated through World Education Services -WES).

- Completed Application along with the required amount of application fees
- Three Letters of Recommendation
- Statement of Purpose
- GRE Scores
- Financial Affidavit (International Students –only)
- Test of English as Foreign Language (TOEFL) Scores (International students only).

Graduation Requirements:

A. The Master of Science, Non-Thesis Option

The **non-thesis** M.S. is a professional degree in which a student must complete a minimum of 32 credit hours of graduate course work to receive the degree, and other requirements may be specified by the department. Thus, programs leading to this degree provide opportunities for students to increase their knowledge and competencies in the various agricultural disciplines. A student, according to his/her needs may **(a)** obtain a balanced and unified training encompassing a wide spectrum of subject matter area or **(b)** obtain intensive training in a specified area. The emphasis of the program is to enable students to develop skills as professional practitioners in the communication of technical knowledge and its application to the solution of current and future technical, economic, and social problems of individuals and groups. The expected duration of the Non-Thesis Option program is 12-18 months.

- Core Courses: 14 Credits
- Area of Concentration (APSC) Courses: 12 Credits
- Elective Courses: 6 Credits (Any graduate level courses 500 or above outside APSC**)**
- Admission to Candidacy
- Passing of the Final Oral Examination

Course and Credit Requirements for the Master of Science, Non-Thesis Option

To earn a professional degree, a minimum of **32 graduate credits** are required comprising **14 credit hours** of core courses, **12credit hours** for the area of concentration (Animal Sciences; APSC) of which **6 credit hours** must be at the **600 level or higher**, **6 credit hours at the 500 level**, and **6 credit hours of electives in a discipline other than the student's concentration**. **The final project/paper** will account for **3 credit hours** of the core requirements**.** As all M.S. degree candidates must take at least two graduate courses in biometry (EVSC 500 and 501) before graduation, if undergraduate work was done at Tuskegee University and EVSC 500 was required for graduation, it may not be transferred to graduate work; thus, an appropriate substitute will be required. For those who have not completed EVSC 500, this course may be included in the curriculum as an elective course. All courses must be approved by the Advisory Committee. Following the completion of 15 credits, students are required to be admitted to Candidacy. In addition to the course work outlined above, students must present 1) an **acceptable document** comprising a minimum of 20 pages on a selected professional problem or a report of training and 1) pass a **Final Oral Examination** based on the document as determined by the Advisory Committee.

Core Courses (14 credits):

EVSC 0501	Biostats II (AGEC 0615 – Quantitative Methods or equivalent)	3 credits
AGEC 0505	Agribusiness Management	3 credits*
AGSC 0600	Non-Thesis/Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis/Thesis Graduate Project Seminar II	1 credit
IBSC 0601	Research Ethics in Bioscience	3 credits*
AGSC 0699	Non-Thesis Graduate Project	3 credits

*Courses in discipline approved by Advisory Committee may be substituted for these courses.

Advisory Committee

A three-member Advisory Committee will be appointed to guide and monitor the student's professional development. The chairman of the appointed committee shall serve as the student's advisor.

B. The Master of Science, Thesis Option

The **thesis** M.S. is research oriented and requires a student to complete a minimum of 30 credit hours of graduate course work to receive the degree along with other requirements that may be specified by the department. The program is designed to (1) enhance the understanding of an area of science beyond the baccalaureate level, and (2) attain scientific research skills. Candidates for the M.S. degree are considered "novice" researchers and are expected to require considerable guidance in choosing and executing their thesis research projects. However, upon completion of the MS, the students are expected to have developed some capacity to conduct independent research. The expected duration of the Thesis Option program is ~24 months.

- Core Courses: 8 Credits
- Area of Concentration (APSC): 12 Credits
- Elective Courses: 4 Credits (Any discipline 500 level or above)
- Thesis: 6 Credits
- Admission to Candidacy
- Passing of the Final Oral Examination

Course and Credit Requirements for the Master of Science, Thesis Option

To earn a thesis degree, a minimum of **30 graduate credits** are required comprising 11 core courses, which include **6 credit hours** of 700 level research 6 credit hours of research**, 2 credit hours** of seminar, **3 credits hours** of biometry (EVSC 501) and an additional 16 credit hours including a minimum of **12 credits hours** (500 and 600 series) in the area of concentration (APSC) and **7 credit hours** of electives. As all M.S. degree candidates must take at least two graduate courses in biometry (EVSC 500 and 501) before graduation, if undergraduate work was done at Tuskegee University and EVSC 500 was required for graduation, it may not be transferred to graduate work; thus, an appropriate substitute will be required. For those who have not completed EVSC 500, this course may be included in the curriculum as an elective course. All courses must be approved by the Advisory Committee. Following the completion of

15 credits, students are required to be admitted to Candidacy. In addition to the course work outlined above, students must present 1) an **acceptable thesis** on a selected research project and 2) pass a **Final Oral Examination** based on the document as determined by the Advisory Committee.

Core Courses (11 credits):

EVSC 0500	Biostats I*	3 credits
EVSC 0501	Biostats II (AGEC 0615 – Quantitative Methods or equivalent)	3 credits
AGSC 0600	Non-Thesis/Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis/Thesis Graduate Project Seminar II	1 credit
APSC 0700	Research in Animal Sciences	6 credits

*Courses in discipline approved by Advisory Committee may be substituted for these courses.

Advisory Committee

A Major Advisor will be assigned to the student by the department head if the student has not already identified one. The Department of Agricultural and Environmental Sciences and the Dean of Graduate Programs encourage the formation of an Advisory Committee during the first semester of your graduate studies. In consultation with the Major Advisor, the Advisory Committee should be selected and is comprised of three members (including the Major Advisor). At least two must be in the area of the student's research interest. Together with the Major Advisor, the student will identify a research problem (subject matter to study) and prepare a research proposal for subsequent approval by the committee. It is the student's responsibility to contact each prospective committee member to see if he/she will serve on the Advisory Committee. It is recommended that the student obtain the written approval of each committee member. After the approvals are received, the Department head, College and Graduate School deans are to be notified of the committee members. The Major Advisor serves as chairperson of this committee and will convene meetings at his/her discretion.

Other:

Professional Development Document/Thesis

The final draft of the non-thesis document or the thesis must be filed with the student's Advisory/Examining Committee at least 30 days before the date listed in the university calendar for final copies to be submitted during the semester in which the student expects to graduate. The student must present to the Dean of Graduate Programs a "Preliminary Approval Sheet" (PAS) bearing the signature of the Major Professor before the final oral examination may be scheduled and before copies of the thesis are distributed to members of the Advisory/Examining Committee. After the "Preliminary Approval Sheet" has been signed, it should be submitted to the Dean of Graduate Programs before the final examination is scheduled and before the final draft of the thesis/dissertation is prepared for final approval. Approval of the Professional Development Document/Thesis in its final form rests with the Advisory/Examining Committee.

Transfer Credits
A **maximum of nine (9) semester hours** may be transferred from graduate courses taken at other university provided the student has grades of **"B"** or better in these courses. For students who are pursuing a second Master's degree at Tuskegee University nine hours of credit are transferable from courses taken to fulfill the requirements of the first degree. **Correspondence course credits are not acceptable.** Transfer credits may be recommended under both core and elective categories.

Admission to Candidacy
Immediately after completing 15 credits of course work at Tuskegee University, the student must submit to the Dean of Graduate Studies, a completed application for the Candidacy for the degree.

Seminars
A student pursuing the Master of Science degree in Animal Sciences must present at least two seminars. The first seminar (AGSC 0600) shall be the presentation of the student's research proposal of the Master's thesis. The second (AGSC 0604) shall be his/her final seminar. The student is also required to participate in all seminars arranged by the department regardless of if he or she is enrolled in the course or not.

Research and Teaching Assistantships
Funding through research and teaching assistantships is available for accepted graduate students on a competitive basis. While thesis option students may qualify for support for tuition and stipend; non-thesis option students may only qualify for a work study (15 hr/wk). Research and teaching assistants are expected to provide service to the Department through conducting or assisting with research, teaching and other projects related to the college. Continuation of the financial support depends on student's performance in course work, satisfactory progression on research/professional development project and availability of funds.

List of Courses

(Master of Sciences Non-Thesis and Thesis Options)

AGEC 0505. AGRIBUSINESS MANAGEMENT: 2ndn Semester. Lect. 3. Economic principles applied to organization and operations of farms; introduction to farm financial management techniques.. 3 credits.

AGEC 0615. QUANTITATIVE METHODS. 1ST Semester. Lect. 3. Statistical methods and their applications: probability density and distribution functions as background studying principles of economic models analyses; prediction problems, programming, scheduling and network; special topics of current interest 3 credits. Prerequisites: AGEC 553; ECON 352, 353.

AGSC 0600. NON-THESIS GRADUATE PROJECT PROPOSAL SEMINAR I. 1st and 2nd Semesters. Lect. 1, 1 credit. Lectures from visiting scientists, and other organizations on topics

related to environmental science. Presentation of proposals for thesis/non-thesis projects and technical reports by students on research in environmental science and related areas. This is a unique type of seminar in which knowledge from different areas will be integrated and students will write technical reports from the notes of the lectures combined with literature research. (Only one credit hour for any given semester will be allowed).

AGSC 0604. NON-THESIS GRADUATE PROJECT PROPOSAL SEMINAR. 1st and 2nd Semesters II. Lect. 1, 1 credit. Lectures from visiting scientists, and other organizations on topics related to environmental science. Presentation of project results for non-thesis graduate projects by students on research in environmental science and related areas. This is a unique type of seminar in which knowledge from different areas will be integrated and students will write technical reports from the notes of the lectures combined with literature research. (Only one credit hour for any given semester will be allowed).

AGSC 0699. NON-THESIS GRADUATE PROJECT. 1st and 2nd Semesters, Summer, 3 credits. Research , preparation and production of final project paper under the directions of a major advisor. Students in this program will be required to select research problems on a specific topic concentrating on the investigation of problems in agricultural, environmental and related sciences.

APSC 0501. INTERNATIONAL ANIMAL AGRICULTURE. 2nd Semester (even years). Lect. 3, 3 credits. Emphasis will be placed on all domestic species, utilizing tropical forages, grains and feed, international and animal production and marketing systems. Specific projects on lesser developed countries will be studied. Prerequisite: APSC 0201.

APSC 0503. PHYSIOLOGY OF REPRODUCTION. 1st Semester. Lect. 2, Lab 3, 3 credits. Study of sex determination to include differentiation of the gonads and the secondary sex organs. Anatomy and physiology of the male and female reproductive tract, the endocrinology of reproduction phenomena, fertilization, gestation, parturition lactation, sperm physiology, artificial insemination and factors influencing reproductive performance. Prerequisites: Senior or Graduate Students only or BIOL 305.

APSC 0510. LAB ANIMAL MANAGEMENT. 2nd Semester, 2 Semester. Lect. 2, Lab 3, 3 credits. This course is designed to focus on laboratory animal management, including certification programs associated with working with laboratory animals and concepts relevant to working with laboratory animals (dogs, cats, primates, rabbits, rats, and mice) re: history and purpose of lab animal science, research facility environments, lab animal breeding and husbandry, animal procurement, health and disease, and species specific information.

APSC 0521. MOLECULAR AND IMMUNOGENETICS. 2nd Semester (on demand). Lect. 3, Lab 3, 3 credits. Principles of immunology as applied to genetics with emphasis on genetic, control of cellular antigens, individual variation blood groups and disease transplantation and tolerance, immunogenetics in reproduction and differentiation and concepts of antibody formation. Prerequisite: Minimum of 15 credit hours, Biological Sciences to include genetics.

APSC 0531. COMPANION ANIMAL NUTRITION. 2nd Semester (odd years). Lect. 3, 3

credits. The course addresses basic principles of nutrition; digestive physiology of companion animals; nutritional idiosyncrasies and importance of nutrition in various physiological states; pet food production and selection, and diet-related animal diseases. Students will be exposed to current research findings to illustrate development/refinement of nutritional principles. Prerequisite: APSC 307 or Graduate student standing.

APSC 0540. ANIMAL BIOTECHNOLOGY. 1st Semester. Lect. 3, 3 credits. Introduction to scientific and technical understanding of animal biotechnology, commercial and ethical aspects of the biotechnology on urban and rural communities, potential advantages or threats of biotechnology and their impact on animal agriculture are presented.

APSC 0550. ADVANCED ANIMAL BREEDING AND QUANTITATIVE GENETICS. 2nd Semester (even years). Lect. 3, 3 credits. Emphasis will be placed on the study of forces that changes genetic composition of biological populations, and the scientific application of principles of quantitative genetics in the development of breeding programs for animal and plant improvement. Prerequisite: APSC 401 and EVSC 0500 or Graduate Standing.

APSC 0600 ADVANCED REPRODUCTION PHYSIOLOGY. 1st Semester. Lect. 3, Lab 3, 4 credits. This course presents materials associated with recent advances in research mammalian reproduction to include; application of biotechnology and embryo transfer. Students will be required to conduct an approval research problem during the semester. Prerequisite: APSC 0530 or instructor's approval.

APSC 0601. NUTRITION TOXICOLOGY. 2nd Semester (odd years). Lect. 3, 3 credits. This course addresses basic principles of nutrition and toxicology; classification of toxicants; principles underlying their absorption, distribution, biotransformation and excretion; diagnostics and scope of problems and economic impact to toxicants; how different domestic livestock species differ in their response to toxicants and specific toxicants. The students will be exposed to current research findings to illustrate development/refinement of nutritional toxicology principles.

APSC 0602. RUMINOLOGY. 2nd Semester. Lect. 3, Lab 0, 3 credits. The nutrition of ruminants as contracted to nonruminants; with special emphasis on rumen physiology, nutrients absorption, and the role of rumen micro-organisms in feed utilization. Prerequisite: APSC 0520.

APSC 0603. ADVANCED ANIMAL AND POULTRY NUTRITION. 2nd Semester. Lect. 3, Lab 0, 3 credits. The nutrition of nonruminant animal and methods of design used in nutritional research. Prerequisite: APSC 520.

APSC 0621. IMMUNOGENETICS. 2nd Semester (on demand). Lect. 3, Lab 0, 3 credits. This course is a continuation of APSC 0521, further applying the principles of immunology as applied to genetics with emphasis on genetic, control of cellular antigens, individual variation blood groups and disease transplantation and tolerance, immunogenetics in reproduction and differentiation and concepts of antibody formation. Prerequisite: APSC 0521.

APSC 0630. SPECIAL PROBLEMS IN ANIMAL SCIENCE. 1st and 2nd Semester. 1-Summer.

1-3 credits. Special studies for graduate students in Animal and Poultry Sciences. A presentation of topics not in regularly offered courses. Prerequisite: Permission of Instructor.

APSC 0752. CONTINUOUS REGISTRATION. 1st and 2nd Semesters, Summer. 0 credits. Restricted to Graduate students who have taken all courses including APSC 700 and need to use the service and resources of the University to complete their theses or reading for graduate examinations. Students may have a maximum of two registrations only; afterward registration as a regular graduate student will be required until the degree requirements have been completed. Prerequisite: Permission of major advisor.

APSC 0754. CANDIDATE FOR DEGREE ONLY. 1st and 2nd Semesters, Summer. 0 credits. Restricted to graduate students who have completed all requirements for graduate degree including final oral or comprehensive examination, submission of thesis and approval of the thesis by the Office of the Graduate Programs. Students will be permitted to register in the category one at a time.

EVSC 0500. BIO-STATISTICS I. 1st Semester. Lect. 2, Lab 3, 3 credits. Statistical methods in scientific research. An introductory course in statistics dealing with the application of various methods of analyzing research data to include sampling, randomization, the normal distribution, "t" test, linear regression, correlation, Chi-Square, and analysis of variance of random design. Laboratory assignments require the use of pocket calculators and the University's time share computer.

EVSC 0501. BIO-STATISTICS II. 1st Semester. Lect. 2, Lab 3, 3 credits. The application of advanced statistical methods in analyzing biological data to include analysis of two-way experiments, factorial experiments, covariance analysis, least-square analysis with unequal subclass numbers and curvilinear regression. Laboratory assignments require the use of the University's time share computer and departmental microcomputers. Prerequisites: EVSC 0500 or Permission of instructor.

IBSC 0601. RESEARCH ETHICS IN BIOSCIENCE. 1st Semester Lec. 2 hours. 3 credits. This course is open only to graduate students. A special focus will be ethical problems in bioscience related to race/ethnicity and work of minority bio-scientists. Instructors will primarily serve as learning guides. Extensive student preparation prior to class is essential. Students are expected to participate significantly in class discussion and conscientiously contribute to group work. Independent student research will be required. There are no prerequisites.

****Note: At the time of program development the listed courses comprise APSC courses; however, any APSC courses developed hereafter and meet the requirements indicated may be used to fulfill the concentration requirement indicated above Further, elective courses may include those in any discipline offered at the graduate level (500 or above) as specified above.**

Key Graduate Faculty

Name	Specialty Area	Phone	E-mail Address
B. Ryel Min	Rumen Microbiology, Forage Agronomy, Parasite Management	334-727-8654	minb@mytu.tuskegee.edu
Jannette Bartlett	Poultry Production, Poultry Nutrition, Meat Quality	334-727-8266	jbartlett@mytu.tuskegee.edu
Olga Bolden-Tiller	Reproductive Biology	334-727-8403	obtiller@mytu.tuskegee.edu
Nar Gurung	Silvopasture, Agroforestry, Nutrient Management, Meat Quality	334-727-8457	ngurung@mytu.tuskegee.edu
Uma Karki	Pasture Agronomy, Parasite Management	334-727-8336	karkiu@mytu.tuskegee.edu
Wendell McElhenney	Breeding and Genetics, Biostatistics	334-727-8022	mcelhenneyw@mytu.tuskegee.edu
Chukwuemeka Okere	Physiology, Breeding and Genetics	334-727-8904	cokere@mytu.tuskegee.edu

Additional details that are not shown in this handout may be found in the Bulletin of the Department of Agricultural and Environmental Sciences, the DAES website, the DAES Graduate Student Handbook as well as TU's Graduate Handbook and website.