Tuskegee University

College of Agriculture, Environment and Nutrition Sciences

Department of Agricultural and Environmental Sciences Master of Science (M.S.) in Plant and Soil Sciences

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

* For additional information please refer to the Graduate Handbook.

The Plant and Soil Sciences graduate program offers several specialty areas, such as **biotechnology, breeding, genetics, horticulture, soil microbiology, organic farming, bioenergy** and **much more.** 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 plant and soil sciences research program in this area http://www.tuskegee.edu/academics/colleges/caens/daes/graduate_programs/pss.aspx. Graduates of the program are successfully pursuing careers with government, academia, and industry. Numerous graduates have also gone on to further their education in graduate programs and law school 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 Plant and Soil Sciences, biology, or a related area to be considered for the Master's program in Plant and Soil 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 (PLSS) Courses: 12 Credits
- Elective Courses: 6 Credits (Any graduate level courses 500 or above outside PLSS**)**
- 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 (Plant and Soil Sciences; PLSS) 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 (PLSS): 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 (PLSS) 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
PLSS 0700	Research in Plant and Soil 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 Plant and Soil 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 Science 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.

PLSS 0501. FIELD AND FORAGE CROP PRODUCTION. 1st Semester. Lect. 3, Lab 0, 3 credits. Principles and practices involved in the growth and production of major field and foragecrop production.

PLSS 0510. SOIL PHYSICS. 2nd Semester (Even years). Lect. 3, 3 credits. Theory and practice of quantifying soil particle and pore distributions, soil structure, soil water content, soil water potential , saturated and unsaturated flow, infiltration, drainage, energy balance, evapotranspiration and irrigation.

PLSS 0513. GENERAL ENTOMOLOGY. 1st Semester. Lect. 3, Lab 3, 3 credits. Biology, recognition, and modern methods of controlling major insect pests of major plants and animals. Prerequisite: Instructor's permission. Same as BIOL 0512.

PLSS 0521. SOIL AND WATER CONSERVATION. 2nd Semester. Lect. 2, Lab 3, 3 credits. Theory and practice of soil and water conservation arid management for temperate, tropical and arid region soils; land use planning.

PLSS 0522. PHYSIOLOGY OF PLANT GROWTH AND DEVELOPMENT. 2 Semester. Lect. 3, Lab 3, 3 credits. Dealing with all essential and beneficial nutrient elements, absorption, translocation and their metabolic association in plants.

PLSS 0525. MINERAL NUTRITION AND SOIL FERTILITY. 2nd Semester. Lect. 3, Lab 3, 3 credits. Dealing with all essential and beneficial nutrient elements, absorption, translation and their metabolic association in plants.

PLSS 0530. PLANT BIOTECHNOLOGY. 2nd Semester. Lect. 3, 3 credits. A lecture discussion course for upper-level undergraduate and graduate students in agronomy and horticulture. The purpose is to introduce students to principles and applications of plant molecular and cellular genetics with emphasis on research developments including plant gene transfer, RFLP mapping, and plant gene expression.

PLSS 0555. SOIL CHEMISTRY. 1stSemester, even years. Lect. 3, 3 credits. Theory and practice of the inorganic chemical reactions involved in soil development and nutrient availability and cycling; topics include chemical ion exchange equilibria and kinetics, colloidal systems, solubility diagrams and oxidation reduction. Same as EVSC 0555.

PLSS 0565. BIOTECHNOLOGY. 2nd Semester. Lect. 2, Lab 6, 4 credits. Same as Biology 565. This course is designed to introduce advanced undergraduates and graduate students to basic recombinant DNA techniques including growth and manipulation of phases and their bacterial hosts; isolation, quantitation, and electrophoretic analysis of DNA; restriction and ligation of DNA; cloning in lambda; MS and plasmid vectors; site-specific mutagenesis. The focus of the course is hands-on experimentation; however, time will be devoted to discussion of application of these and other techniques to variety of research problems. By the end of the course, me students should have a working knowledge of basic recombinant technology, should have an introductory knowledge of more specialized techniques, and should be familiar with me terminology and resource literature of genetic engineering.

PLSS 0590. SOIL/ENVIRONMENTAL MICROBIOLOGY. 1st Semester, Odd year. Lect. 3, 3 credits. Description, location, taxonomy, abundance and significance of the major groups of soil microorganisms, major biochemical transformations carried out by the organisms; major biochemical transformations carried out by the soil micro flora and their relationships to soil fertility and environmental pollution are examined. Prerequisites: CHEM 0320 or Permission of Instructor. Same as EVSC 0590.

PLSS 0626. SOIL TESTING AND PLANT ANALYSIS. 1st Semester, odd years. Lect. 2, Lab 3, 3 credits. Principles of plant and soil sample collection, extraction and determination of nutrients, and correlation and interpretation of analytical results; laboratory methods include atomic absorption and flame emission spectrophotometry, specific ion electrodes, and calorimetric, distillation and filtration procedures.

PLSS 0631. ADVANCED FRUIT SCIENCE. 1st Semester, even years. Lect. 3, Lab 0, 3 credits. Principles underlying setting and fruiting habits, including water relations, nutrition, climate, varieties and pruning of horticultural crop.

PLSS 0650. PHYTOHORMONE AND VITAMINS. 1st Semester. Lect. 3, Lab 0, 3 credits. Chemistry, physiology and practical application of phytohormone, vitamins in development of plants.

PLSS 0676. PHYSICAL CHEMISTRY AND MINERALOGY OF SOILS. 1st Semester, even years. Lect. 2, Lab 3, 3 credits. A study of me structure and nature of clay minerals and physical

chemistry techniques to investigate physic-Chemical properties of soils. Prerequisites: PLSS 0626 and Permission of instructor.

PLSS 0680. ADVANCED PLANT BREEDING. 2 nd Semester, odd years. Lect. 2, Lab 3, 3 credits. A study of me relationships between plant breeding methods and their utilization in advancing genetic material. Both practical and theoretical uses will be dealt with as related to crop improvements. Prerequisites: PLSS 0530 or Consent of advisor.

PLSS 0681. ADVANCED VEGETABLE CROPS. 2nd Semester, even years. Lect. 2, Lab 3, 3 credits. A study of cultural practices of specific vegetable crops with emphasis being placed on growing, harvesting and marketing. Prerequisites; PLSS 530 or consent of advisor.

PLSS 0695. SPECIAL TOPICS IN ENVIRONMENTAL, NATURAL RESOURCE AND PLANT SCIENCES. 1st and 2nd Semester. Lect. 3, 3 credits. Topics at the advanced level may be selected from the following: biochemistry, plant physiology and soil sciences.

PLSS 0752. CONTINUOUS REGISTRATION. 1st and 2nd Semesters, Summer. 0 credits. Restricted to graduate students who have taken all courses including PLSS 0700 and need to use the service and resources of the University to complete their theses or reading for graduate examination. Students may have a maximum of two registrations only; afterward registration as a regular graduate student will be required until degree requirements have been completed. Prerequisite: Permission of major advisor.

PLSS 0754. CANDIDATE FOR DEGREE ONLY. 1st and 2nd Semester, 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 time only.

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 PLSS courses; however, any PLSS 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
Kokoasse A-Kpomblekou	Soil Chemistry and Waste Management	334-724-4522	akpomblekou@mytu.tuskegee.edu
Ramble Ankumah	Soil Sciences, Environmental Sciences		rankum@mytu.tuskegee.edu
Conrad Bonsi	Plant Breeding	334-727-8333	cbonsi@mytu.tuskegee.edu
Marceline Egnin	Plant Biotechnology/Molecular Biology and Plant Breeding	334-724-4404 or 727-8084	Megnin@mytu.tuskegee.edu
Guohao He	Plant Genomics, Genetic Mapping, QTL Mapping, Molecular Breeding	334-727-8459	Hguohao@mytu.tuskegee.edu
Jacquelyn Jackson	Plant Biotechnology/Molecular Biology	334-724-4953	jjackson@mytu.tuskgee.edu
Desmond Mortley	Horticulture, Hydroponics, Sustainable Agriculture, Biofuels	334-727-8404	mortleyd@mytu.tuskegee.edu
Channapatna S. Prakash	Plant Biotechnology/Molecular Biology	334-727-8023	Prakash@mytu.tuskegee.edu
Franklin Quarcoo	Entomology	334-727-8792	quarcoof@mytu.tuskegee.edu
Raymon Shange	Agroecology, Microbial Ecology, Molecular Ecology, and Ecological Engineering	334-724-4967	rshange@mytu.tuskegee.edu

Additional details that are not shown in this handout may be found on 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.