

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

Contact Information:

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

The Environmental Sciences graduate program offers several specialty areas, such as climate change, watershed management, environmental health, fate and transport of environmental toxicants, soil health, hydrology, geospatial science and nutrient and ecosystem management. 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 environmental science research program in this area

http://www.tuskegee.edu/academics/colleges/caens/daes/graduate_programs/ms_in_envIRON.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 Environmental Sciences, biology, or a related area to be considered for the Master's program in Environmental 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 for residential programs. For the online program, acceptance may also be obtained by the completion of two program core courses with a minimum B grade for individuals who meet the criteria above.

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 (*Residential and Online*)

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 (EVSC) Courses: 12 Credits
- Elective Courses: 6 Credits (Any graduate level courses 500 or above outside EVSC)
- 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, **12 credit hours** for the area of concentration (Environmental Sciences; EVSC) 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 (*Residential Only*)

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 (EVSC): 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

(EVSC) 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
EVSC 0700	Research in Environmental 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. 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 Environmental Sciences must present at least two seminars. The first seminar (AGSC 0600 or equivalent) shall be the presentation of the student's research proposal of the Master's thesis. The second (AGSC 0604 or equivalent) 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 (residential only). 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: 2nd Semester. Lect. 3. Economic principles applied to organization and operations of farms; introduction to farm financial management techniques. 3 credits.

AGEC 0553. MACROECONOMICS AND APPLICATIONS IN AGRICULTURE. 2nd Semester. Lect. 3, 3 credits. An advanced look at theory and applications to agriculture of the circular flow framework, supply and demand in the macro-economy, labor and factor markets, aggregate real supply and demand analysis; effects of fiscal and monetary policy on the price level, real output, and unemployment; budget deficits, and stability of the banking system.

AGEC 0604. MICROECONOMICS. THEORY AND APPLICATIONS TO AGRICULTURE. 1st Semester. Lect. 3, 3 credits. Advanced topics in consumer and producer theory and applications to agriculture, equilibrium models and their application to agriculture, externalities and public goods, welfare, alternative market structures, simple dynamic models and resource depletion, choice and uncertainty.

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: AGECE 553; ECON 352, 353.

AGEC 0622. RESEARCH METHODOLOGY. 1st Semester. Lect. 3, 3 credits. Selection, planning and conduct of research; alternative approaches, role of theory, beliefs and values. Critical appraisal of research tools and studies, empirical development, presentation and defense of researchable problems by students. Prerequisite: one year of graduate work, including statistics.

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.

ECON 0512. INTRODUCTION TO INTERNATIONAL TRADE. 2nd Semester. Lect. 3, 3 credits. This course explores concepts, analytical tools and their applications to international economics. Introduction to theory and empirical foundations of international trade and factor movements. The theory of multi-country, multi-commodity trade. Problem of international disequilibrium. Public and private barriers to trade and monopoly of international trade. Search for economic stability and growth through international cooperation. International monetary

funds. International monetary system. Role of international trade and aid in economic development. Prerequisites: ECON 0201, 0202, 0352 and 0353.

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.

EVSC 0504. ENVIRONMENTAL SCIENCE II. 2nd Semester. Lect. 3, 3 credits. Problems related to the presence of biologically active substances and potential hazardous synthetic chemicals in the environments. Strategies in minimization and management of these hazards will be discussed. Pesticides, radiation hazards, industrial chemical and potential biological hazards will be considered. Prerequisites: CHEM 0320 or Permission of Instructor.

EVSC 0507. INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS. 1 Semester. Lect. 2, Lab 1, 3 credits. Introductions to GIS concepts. Basic theoretical concepts, computer cartography, database systems, getting maps into digital form and geocoding. Familiarity with Arc-GIS software.

EVSC/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.

EVSC 0520. INTRODUCTION TO EPIDEMIOLOGY. 1st Semester, Lect. 3, 3 credits. This course is designed to teach students how to study the determinants and distribution of disease frequency in human populations, along with the associated risk factors. Students will study how to design a research project, ethics involving data collection and dissemination, descriptive epidemiology, quantitative measures and terminology. Completion of this course will allow the students to devise and applying epidemiologic principles to address relevant environmental health problems in their communities.

EVSC/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.

EVSC 0555. SOIL CHEMISTRY. 1st Semester, 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. Prerequisites: CHEM 0231, 0232, PLSS 0210. Same as PLSS 0555.

EVSC 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 PLSS 0590.

EVSC 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.

EVSC 0695. SPECIAL TOPICS IN ENVIRONMENTAL SCIENCES. 1st and 2nd Semesters. Lect. 3, 3 credits. Topics in the advanced level may be selected from the following: biochemistry, environmental sciences, chemistry, biology, soil sciences and veterinary sciences.

EVSC 0752. CONTINUOUS REGISTRATION. 1st and 2nd Semesters, Summer. 0 credits. Restricted to graduate students who have taken all courses including EVSC 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.

EVSC 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.

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.

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

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.

****Note:** At the time of program development the listed courses comprise EVSC/PLSS courses; however, any EVSC/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. For students enrolled in the online program, availability of courses may be available on a limited basis; students will need to confer with online degree the program coordinator.

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
Deloris Alexander	Prebiotics, Probiotics	334-724-4667	dalexander@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
Gamal El Afandi	Climate Change	334-724-4790	geafandi@mytu.tuskegee.edu
Souleymane Fall	Climate Change, GIS	334-421-7567	sfall@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.tuskegee.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
Joseph Quansah	Hydrology, Watershed Management, Climate Change, Geospatial Science and Information Systems	334-727-8419	jquansah@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.