

Tuskegee University

College of Agriculture, Environment and Nutrition Sciences

DEPARTMENT OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

GRADUATE STUDENT HANDBOOK

August 2013, Version 1

INTRODUCTION

You have been accepted by the Graduate School and the Department of Agricultural and Environmental Sciences to pursue a Master of Science (MS) – Thesis option, Master of Science – Non-thesis option, or Doctorate of Philosophy (PhD) degree. The Department’s faculty recognizes you as an independent, motivated individual who will achieve your goal of becoming a professional scientist/agricultural economist. While enrolled here and after you graduate, you are representatives of Tuskegee University. The image you project among your colleagues and acquaintances forms the image for the Department, College, and University. This handbook/manual was compiled to assist graduate students and faculty in the Department of Agricultural and Environmental Sciences. It comprises the advanced degree requirements and other information relevant to the graduate program in the Department. In many cases, the degree requirements given are those specific to the Department. The *Tuskegee University Graduate Handbook: Academic Regulations and Procedures* must be consulted for additional University requirements. Further, IBS PhD students should refer to the *IBS PhD Graduate Student Handbook*. Certain attributes are critical for success in Graduate School. Your acceptance demonstrates that you meet the requirements for enrolling in Graduate School. You must be able to exercise diligence, self-discipline, patience, and perseverance. Obtaining an advanced degree involves a large investment of time and money by you and by Tuskegee University, which requires you to be dedicated and committed to the program.

GRADUATE PROGRAMS IN THE DEPARTMENT

The Department of Agricultural and Environmental Sciences offers MS degree programs with either a non-thesis or thesis option. According to the *The Tuskegee University Graduate Handbook: Academic Regulations and Procedures*, “a student must complete a minimum of 30 credit hours of graduate course work to receive the degree, and other requirements may be specified by the department.” The Department’s specific requirements will be discussed later (page 6) in this document

These MS degrees are awarded in Agricultural Resource Economics (with emphasis in Rural Economic and Community Development, Agribusiness Management, and Natural Resource Economics), Animal Sciences (with emphasis in Nutrition, Reproductive Physiology, Animal Biotechnology, Molecular Immunogenetics, and Breeding), Environmental Sciences, and Plant and Soil Sciences (with emphasis in Plant Physiology, Vegetable Crop Production/Nutrition, Plant Biochemistry, Plant Biotechnology, Soil Science, and Sustainable Agriculture). Students take courses relevant in their areas of emphasis and are required to do thesis research as part of the requirements for obtaining the MS degree, or an acceptable paper to obtain the MS degree – non-thesis option.

GRADUATE STUDENT STATUS

Full Graduate Status

A graduate with a BS degree from an accredited or approved institution who possesses the necessary undergraduate preparation in the field in which study is intended, and who has a minimum cumulative grade point average (CGPA) of **3.00**, may be admitted with full graduate status. Admission as a graduate student does not constitute candidacy for the MS or Non-Thesis option degree. Such candidacy may be achieved only on the basis of the student’s graduate record at Tuskegee University.

Conditional Graduate Status

A student who exhibits one or more of the following at the time of application to graduate studies may be admitted as a conditional student with the approval of the Dean of Graduate Programs: (1) a deficiency in curricular requirements in the field in which study is desired, or (2) a deficiency in admission requirements set by the College or Department, or (3) a CGPA of less than **3.00** but greater than **2.70**, upon the recommendation of the Department Head and College Dean. Additionally, a student with an incomplete transcript may be admitted conditionally for **one semester only**.

If a conditional graduate student does not achieve full graduate status after the completion of nine (9) semester credit hours of graduate level courses (**minimum GPA of 3.00; courses may not include Research or Special Problems courses**), the student shall forfeit admission as a conditional graduate student.

A student may advance from conditional graduate to full graduate status upon the recommendation of the Dean of the College and approval by the Dean of Graduate Programs.

To apply for change from conditional graduate to full graduate status, the student and the Major Advisor must submit five (5) copies of the APPLICATION FOR CONVERSION FROM CONDITIONAL GRADUATE TO FULL GRADUATE STATUS, along with a transcript, to the College Dean. The College Dean's recommendation of change will be indicated by forwarding the student's five (5) originally signed copies and an official transcript to the Dean of Graduate Programs.

Upon receiving full graduate status, the student may have a review of credits awarded during the conditional period for consideration of credit toward the degree. Prior to the initial registration, the conditional student must have received the College Dean's approval to study courses for credit which must be based on a specified level of academic performance.

ACADEMIC STANDING

A graduate working for a MS degree at Tuskegee University must maintain a "B" (**3.00**) average in all work included in the program of study outlined for the degree, with no more than six (6) semester hours of "C" grades (that is, no more than 2 "Cs"). Grades of "D" are not acceptable. When the student's record falls below **3.00**, **probation** becomes automatic. If at the next session in which the student is registered (semester or summer), the CGPA does not equal or exceed **3.00**, then the graduate status will be **forfeited**, and the student will no longer be permitted to pursue work leading to a graduate degree at Tuskegee University.

Graduate Record Examination

The Graduate Record Examination (GRE) is required before a student is accepted by the Graduate School. The Graduate School accepts applicants with GRE verbal and quantitative scores of 540 and above on paper test (range 200-800). New GRE scores based on computer tests (range 130-170) are required after August 2011). However, applicants with lower GRE verbal and quantitative scores are encouraged to submit their scores for consideration by the Graduate School. Graduate Record Examination scores more than FIVE YEARS OLD are not acceptable as fulfillment of the GRE requirement. (See the *Tuskegee University Graduate Handbook: Academic Regulations and Procedures*).

THE MAJOR ADVISOR

For the greatest success, you must work in an area that is of interest to you, and with an advisor whose focus area is compatible with your interest. Your Major Advisor is the key person in your graduate program. In many cases, the research area you choose will be related to an on-going research project.

Your Major Advisor has an obligation to help you attain your highest intellectual level. Through years of productive work and experience, your advisor has earned the privilege of guiding graduate students. This individual has gained perspective and breadth of knowledge, which is available to you.

Communication between you and your Major Advisor is critically important. It is your obligation to inform him/her of professional deadlines which you may have with other faculty members, or questions you may have regarding the University administration. For example, suppose a student wishes to make a special request of another faculty member, it is ok, but the Major Advisor should be made aware that the request is being made. In many instances, the advisor can smooth the way for the student through a preliminary contact.

PROGRAM OF STUDY AND RESEARCH

GENERAL

The roles of graduate students include, but are not limited to, the following:

- Graduate students should be in constant communication with the major advisor and the advisory committee.
- Students should expect assignments besides their area of research as service to the Departmental goals.
- Students are responsible, with the help of the advisor, to keep deadlines, contact with committee members, and complete the necessary paperwork for candidacy, thesis defense, and graduation.
- If a graduate student is receiving a stipend from the Department, he/she should be open to help with teaching, outreach, and other research activities as assigned by their major advisor, advisory committee, or Department head.

Most graduate students (except MS Non-Thesis Option students) will be engaged in research and a limited number will be Teaching Assistants during their course of study. The student, with the aid of the Major Advisor, will choose a specific area of research/interest (if MS Non-Thesis Option). The actual research project will be in a specific area of interest common to both the student and the advisor and will culminate in a thesis or final paper. To help guide the student through the process, this handbook highlights many of the procedures, including a recommended schedule (Appendix A). There are also times when graduate students may participate in extension activities such as field demonstrations days, or other service-oriented events. Training in these areas can be a great benefit to students in a subsequent job.

APPOINTMENT AND DUTIES OF ADVISOR, GRADUATE ADVISORY COMMITTEE, AND APPROVAL OF PLAN OF STUDY

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 (**Please refer to the Graduate School website - http://www.tuskegee.edu/graduate_studies_and_research/gsr-forms.aspx**). 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 your research interest. The Major Advisor plays a key role in the composition of the committee. 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 will be notified of the committee members. The Major Advisor serves as chairperson of this committee and will convene meetings at his/her discretion.

The functions of the Advisory Committee are as follows:

- To guide in developing a pertinent and challenging research program of study. This will be prepared as a research proposal and presented and defended before the committee for approval.
- To provide counsel when problems arise in your work.
- To ensure that you have reached a satisfactory level of academic achievement prior to conferring your degree, including administering the final examination and approving the thesis.

The student is encouraged to make full use of this committee and may at any time, after consulting with the Major Advisor, request a meeting with the committee to have the committee's judgment expressed on certain questions that arise.

The duties of the Advisory Committee are accomplished partially through a series of meetings between the committee and the student. These include:

1. A meeting to discuss and approve the student's plan of study and thesis proposal. This meeting shall be held during the student's first semester. The proposed plan of study shall be approved by signature of the committee members. Prior to this meeting, the student, with guidance from the Major Advisor, shall prepare and distribute (at least one week before the meeting) the thesis proposal to the committee members. The thesis proposal shall include a brief literature review, hypothesis being tested, objectives, methodology, and expected outcomes. The proposed research will then be discussed and recommendations sought. If a new draft is required, it should be accomplished within one month. Approval of the thesis proposal of at least three committee members will be required. Subsequent revision of the plan of study may be accomplished by consulting committee members individually.

2. On completion of the academic program and thesis, the final oral examination shall be administered by the Advisory Committee and two additional members selected in consultation with the Major Advisor. The thesis should be presented to the committee members at least two weeks before the scheduled oral examination date. This examination shall determine the student's ability to defend the methodologies, findings, and conclusions of the thesis, and the student's ability to relate the research findings to the pertinent literature.

REQUIREMENTS FOR THE MASTER OF SCIENCE- NON-THESIS OPTION AND MASTER OF SCIENCE DEGREES

A. The Master of Science - Non-Thesis Option

The **non-thesis** MS is a professional degree in which a student must complete a minimum of 30 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 Department head shall appoint a three-member Advisory Committee to guide and monitor the student's professional development. The chairman of the appointed committee shall serve as the student's advisor. Early in the first semester of the program, the student will inform the committee of his/her background and aspirations. The committee will suggest to the student how to achieve these goals and the standard of professional competence required for the non-thesis MS degree. The degree can be obtained with emphasis in Agricultural Economics, Animal and Poultry Sciences, Environmental Sciences, and Plant and Soil Sciences.

If students desire to switch from thesis to non-thesis option, this decision must be approved by the Advisory Committee, Department Head, and college Dean **AND the student will have to sign a contract agreeing to pay back any tuition provided while on the thesis option (effective for students beginning Fall Semester 2012).**

A. Student Enrollment:

- a. **Quality of Students---** A baccalaureate or professional degree earned from an accredited college or university. A GPA of 3.00 based on the 4.00 grading system for all previous work, and the required graduate record examination. Prerequisite academic work giving evidence that the applicant should be able to effectively pursue the graduate courses of the discipline in which specialization is desired. Three letters of recommendation from individuals acquainted with the applicant's academic program and scholastic ability (community person, college professor and clergy).

- b. Enrollment Expectation--- Students who over the past 6 years did not complete the thesis-option program must re-establish contact with the department head within one month of being contacted, complete 30 course credit hours, and be prepared to pass a comprehensive examination with emphasis in his/her respective discipline. The duration of the Non-Thesis Option program is 12-18 months. For former students who reapply, the completion of work must be done within one semester.

***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 of which **6 credit hours** must be at the **600 level or higher**, **6 credit hours at the 500 level**, and **3 credit hours of electives in a discipline other than the student's concentration**. **The final project/paper will account for 3 credit hours for**. All courses must be approved by the Advisory Committee.

Core Courses: Fourteen (14) credit hours of core courses are required:

EVSC 0501	Biostats II (or equivalent or AGECE 0615 – Quantitative Methods)	3 credits
AGECE 0505	Agribusiness Management	3 credits*
AGSC 0600	Non-Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis Graduate Project Seminar II	1 credit
IBSC 0601	Research Ethics in Bioscience	3 credits*
AGSC 0699	Non-Thesis Graduate Project	3 credits
TOTAL CORE		14 credits

^zFor additional courses please see Appendix. ^yCourses in discipline approved by Advisory Committee may be substituted for these courses.

Professional Development Document Requirement for the Master of Science - Non-Thesis Option

The student must present an acceptable document comprising a minimum of 20 pages on a selected professional problem or a report of training before the Advisory Committee as well as in a seminar setting. This 20 page document should include a minimum of five pages using the guidelines of the Professional Agricultural Workers Conference (PAWC; see Appendix). The remaining pages may expand on the topic outlined in the five pages above with the PAWC proceedings format and 15 of which can include a "Literature Review," (which is not referred to in the PAWC document) on the subject that might be submitted to a journal as a review article. Please follow the directions for Section A concerning manuscripts to be submitted for Regular Oral Presentations. The headings referred to in the "Text" portion refer to those that are aligned with a journal article, such as Introduction, Materials, Methods, etc. This portion of the document should be 5-7 pages at minimum with a total minimum of 20 pages and can include an additional Literature Review section as a part of the total 20 pages. The final document should include a cover page as well as other supplemental pages similar to those for the thesis degree, such as Acknowledgements, Table of Contents, etc. **The document is due in the Department head's office in accordance with the deadline for graduate thesis, which is generally in mid-March for May graduation in the respective year and early June for August graduation in the respective year.** Please also note that this document is due in the Dean's office at least 30

days prior to the date which it is required to be submitted to the department. Individuals who fail to submit the MS documents, including the non-thesis document, may not be able to receive the appropriate signatures so that the final document can be submitted to the Graduate Office by the mid- March date.

Up to three graduate credits will be given for an acceptable professional development document. The student may be required to provide one or more copies of the paper for the University. Students enrolled in the MS Non-Thesis degree program may also be required to take a comprehensive written examination in their respective disciplines.

B. The MS Degree – Thesis option

The objectives of the MS degree program, which is research oriented are (1) to enhance the understanding of an area of science beyond the baccalaureate level, and (2) to attain scientific research skills. Candidates for the MS 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.

C. Course and Credit Requirements for the MS Degree

General requirements for the MS degree are outlined in the *Tuskegee University Graduate Handbook: Academic Regulations and Procedures*. Specific departmental requirements are as follows:

1. Any deficiencies must be removed to the satisfaction of the advisory Committee
2. A minimum of 30 graduate credits are required, comprising a minimum of 24 credit hours of course work, and a minimum of 6 credit hours of 700 level research.
3. At least 18 credits in the 500 and 600 series combined must be included in the program.
4. A minimum of 12 credits in courses (500 and 600 series) must be completed in the program area of focus.
5. All MS degree candidates must present two (2) seminars. The first will comprise of the proposed work, including current relevant literature, methodology, and expected results. The second will cover thesis research results, discussion and conclusion. Seminars provide an opportunity to develop skills in presenting technical information to a group of peers, and permit students to become acquainted with specialists in their respective area of specialization.
6. All MS degree candidates must have taken at least two graduate courses in biometry (Biostatistics 500 and 501) before graduation. If undergraduate work was done at Tuskegee University, Biostatistics 500 was required for graduation and may not be transferred to graduate work. In such cases, an appropriate substitute will be recommended by the Advisory Committee.
7. A thesis is required for the MS degree.

Enrollment of Graduate Students Receiving Stipends

Graduate students holding the title of Research Assistant, or Teaching Assistant will be required to register in the Graduate Programs during the Fall and Spring semesters. Students who have completed course requirements are required to be registered for the appropriate categories (courses numbered 700, 752, or 754). Students remaining in the Graduate Program during the summer session, must register for at least the continuous registration course (course numbered 752).

Credit Hours Per Session			
Graduate Statue	Fall	Spring	Summer
Full-Time*	12	12	6
1/4 Research or Teaching Assistant (working 10 hr/wk)	9	9	6
3/8 Research or Teaching Assistant (working 15 hr/wk)	9	9	6
1/2 Research or Teaching Assistant (working 20 hr/wk)**	9	9	6
3/4 Research or Teaching Assistant (working 30 hr/ wk)	3	3	3
Full-time Staff or Faculty	3	3	3

*A Graduate student not receiving a Research or Teaching Assistantship or one who is enrolled in the Occupational Therapy program. **Departments and Advisory Committees may assign no more than 18 credit hours total for the three terms.

D. Credit Hour Requirements

Satisfactory completion of at least 30 hours of graduate courses for credit is also required before a student may be recommended for the MS degree. 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.**

Graduate Credit for Undergraduates

An undergraduate student who requires less than 15 credit hours of course work for the completion of requirements for the baccalaureate degree may select certain courses for graduate credit provided the cumulative grade point average is 3.00 or above. These courses must be confined to those designated "For Advanced Undergraduate and Graduate Students." These courses are usually listed at the 500 level. An undergraduate student may not enroll in 600 level courses. A grade of "B" or better in such courses is required for application to graduate credit. A student who meets the requirements and petitions for graduate credit can apply these courses for graduate credit only after being admitted to the Graduate Program, and after the department in which the study will be pursued accepts the work for graduate credit. **NOT MORE THAN NINE (9) SEMESTER HOURS OF SUCH WORK MAY BE COUNTED TOWARD AN ADVANCED DEGREE.**

E. Thesis

The thesis problem area for the MS degree program is chosen by the student in consultation with the Major Advisor, subject to approval by the graduate Advisory Committee. In general, the

thesis problem should be of interest to the student and should contribute to his/her respective field of specialization. Current Graduate School thesis regulations, as outlined in the *Tuskegee University Graduate Student Handbook: Academic Regulations and Procedures* are to be followed. It is the responsibility of the student to arrange for typing, illustrations, and reproduction of the thesis.

F. Publication of Papers based on Thesis Research

The culmination of a student's graduate program should be the publication of thesis research. Responsibility for preparation of the manuscripts' draft resides with the student who will be first author. **The first draft should be submitted to the student's major research advisor within six (6) months after a successful thesis defense.** Ideally, the thesis should be organized such that each chapter is reflective of a manuscript. If the first draft of the manuscript is not received within this time, the research advisor is free to prepare the manuscript and become the senior author, and the student, junior author. Exception to this policy must be arranged with the student's major research advisor prior to the six month deadline.

ASSISTANTSHIPS AND OTHER OPPORTUNITIES FOR FUNDING

Assistantships (Teaching and Research) and fellowships, which may include tuition scholarships and/or work study stipends, are available to graduate students in regular status (enrolled fulltime) on a limited and competitive basis except students enrolled in the MS Non-Thesis Option. **The MS Non-Thesis Option is a non-tuition scholarship, non-fellowship program and there is no research project mandated by this program** although students in conjunction with their faculty advisor and advisory committee may select a professional development project that involves research. The length of assistantship support (research assistantship or teaching assistantship) may vary depending on the source of funds, but as a general rule, support will not extend beyond two years for a MS degree. Failure to maintain satisfactory scholastic standing (3.0 CGPA) for two consecutive semesters may result in the stipend and tuition scholarship being revoked.

Research Assistantship

Graduate Research Assistants are expected to provide service to the Department, usually through conducting or assisting with research in their advisor's research program. Graduate students receiving a research assistantship may also be expected to assist with teaching classes. This is not only a service to the Department, but also benefits the student by giving them teaching experience. When you teach, you will work with a faculty member so that you may observe appropriate methods and effective approaches to teaching students. Research assistants may conduct laboratory sessions, grade papers, prepare materials for use in laboratory and/or lectures, and serve as a link between the students and faculty in some of the courses where there is a large enrollment. Once assigned, it is the responsibility of the Research Assistant to meet this commitment irrespective of whether he/she has a test the next hour or some other distracting influence. It is the Research Assistant's responsibility to be prepared before entering the classroom.

Teaching Assistantship

Graduate students funded with teaching assistantships are required to serve as Teaching Assistants at least 3 of 4 semesters during their graduate program. Teaching Assistants are expected to assist faculty with grading assignments, quizzes, tests, and help with teaching laboratory sections of their courses. Graduate student Teaching Assistants are expected to work with undergraduates in a professional manner to maintain confidentiality in the course and adhere to the code of ethics for faculty as stated in the bylaws within the *Tuskegee University Faculty Handbook*.

Non-Thesis Option Students

Non-thesis option students are not eligible for teaching or research assistantship; however, they are eligible to receive work study at 15 hours per week at the graduate student hourly rate. These funds are not guaranteed, but subject to availability by potential mentors or other funding sources.

TEACHING EXPECTATIONS AND CONDUCT

Teaching Assistants encourage the free pursuit of learning in students. They hold the best scholarly standards of discipline, demonstrate respect for the student as an individual, and adhere to their proper roles as intellectual guides and counselors. Teaching Assistants make every reasonable effort to foster honest academic conduct to ensure that evaluation of students reflects their true merit. They respect the confidential nature of the relationship between Teaching Assistant and student, avoid any exploitation of students for private advantage, acknowledge significant assistance from them, and protect their academic freedom. Graduate students, irrespective of their degree option or funding type, may be asked to serve as a Teaching Assistant and are expected to work with undergraduates in a professional manner to maintain confidentiality in the course and adhere to the code of ethics for faculty as stated in the bylaws within the *Tuskegee University Faculty Handbook*.

RESEARCH

An important part of the MS degree program will consist of credit earned from research. In conducting research, you have both an opportunity and a responsibility to utilize your abilities in planning, conducting, summarizing, and publishing your results. Competence as a scientist will be judged on originality and scientific quality of your research including the way in which it is presented in written and verbal form. Before undertaking any research, you should:

- Review all literature pertinent to the research you will be conducting, and;
- Submit a written proposal to your committee. This proposal will consist of:
 - Literature Review
 - Objectives
 - Importance of the problem
 - Methodology
 - Some specific observations on experiments that will be performed
 - System of data analysis

All original records made in conducting your research are the property of the Department of Agricultural and Environmental Sciences and the Agricultural Experimental Station; therefore, copies must be duplicated for you and your advisor. Microscopic slides, computer data files, photographs, and computer programs also remain the property of the University.

INTELLECTUAL PROPERTY

Students and Graduate Assistants, with or without monetary compensation working on any project under the direction and control of the University, shall be subject to the patent and copyright regulations to the same extent as an employee. Bound laboratory notebooks and raw data are to be kept in the manner prescribed by the student's research advisor in a way that also protects the intellectual property of the University. Generally, only copies (not originals) of notebooks or data may be removed from the laboratory for computations, analysis, or report preparation. It is expected that research advisors will give students credit for their authorship contributions to published work. Students should not submit publications or grant applications resulting from research conducted in a research advisor's laboratory without the approval of the research advisor.

TRAVEL

Graduate Student Travel

Graduate students in the Department of Agricultural and Environmental Sciences are encouraged to travel to regional and national scientific meetings to present their research results. The Agricultural Experiment Station/major Advisor research grants will make travel awards as funds are available. For students to be eligible for these funds, they must present a paper or poster and must submit a Travel Request Form along with an abstract of the presentation at least three months prior to the meeting. Students are expected to make the mandatory on-campus research activities and deadlines before they are eligible for the travel awards, but exceptions may be granted at the discretion of the Department Head or Research Director. Students that fail to fulfill this requirement could jeopardize their reimbursement for travel expenses or eligibility for future travel awards. Students are only eligible to receive travel awards from the Department/Experiment Station once each fiscal year, but are encouraged to seek alternative funds for travel to additional meetings.

RELATIONSHIP BETWEEN GRADUATE STUDENTS AND NON-ACADEMIC EMPLOYEES

You should get acquainted with key persons within the Department, Experiment Station, and the College. This includes executive/administrative assistants/secretaries, as well as other support staff and personnel (farm crew, custodians, Research Technicians/Assistants, etc.); these persons can be of assistance in a great number of ways and under many circumstances, and each one is considered a partner within the college.

KEYS

You may obtain keys for access to areas approved by your Major Advisor through the Department Head. Your possession of any keys that were not obtained from an approved University source puts you in jeopardy with Campus Security. Keys are to be returned prior to leaving. Campus Security has the right to know that persons in buildings after closing hours are there with the approval of people in responsible positions (Department Head, faculty, etc.).

PARKING

Parking is available and arrangements must be made with Campus Security to obtain the necessary decals/permits. Graduate students must adhere to the university policy for Student Parking.

USE OF UNIVERSITY EXPERIMENTATION VEHICLES

Students will be allowed the use of University vehicles in the process of carrying out their research activities, upon the request of the Major Advisor. Students must possess a valid driver's license and **MUST HAVE SUCCESSFULLY COMPLETED THE DEFENSIVE DRIVING COURSE** offered by the Tuskegee University Police Department.

REASSIGNMENT/DISMISSAL OF GRADUATE STUDENTS

At any time during the MS program, an advisor may, with just cause, choose to terminate an association with a student. The advisor would place the student on 30-day probation with notification to; Department Head, College Dean, as well as the Dean of the Graduate School. The notification should identify specific problems resulting in dismissal proceedings and steps for resolution of the conflicts. During the probationary period, the student could (1) seek to correct the problems with the current advisor, or (2) seek to develop an association with a new advisor. If satisfactory resolution has not been made within the 30-day period, termination would occur. Please see the *Tuskegee University Graduate Handbook: Academic Regulations and Procedures* on the process of changing advisors, etc.

Appendix

NON-THESIS PROJECT APPROVED BY:

Major Professor

Committee Member

Committee Member

Committee Member

Dean of College

Dean of Graduate Programs

FOR:

Student

Title of Non-Thesis Project

Tuskegee University
Department of Agricultural and Environmental Sciences

Plan of Graduate Study

For Master of Sciences (Non-Thesis) in

Animal and Poultry Sciences Plant and Soil Sciences Environmental Sciences

Student ID: _____

Name of Student: _____
First Middle Last

Previous Record: _____
Degree Major University/Date

Department Enrolled: _____

Major Professor: _____
Name Department Telephone Number

Courses Proposed: (List only graduate courses)

CORE COURSES (14 credits)

<u>Course Number</u>	<u>Course Title</u>	<u>Credits</u>	<u>Semester</u>
EVSC 0501	Biostatistics II	3	_____
AGSC 0600	Graduate Seminar I	1	_____
AGSC 0604	Graduate Seminar II	1	_____
IBSC 0601	Research Ethics in Bioscience*	3	_____
AGSC 0699	Non-Thesis Graduate Project	3	_____
AGEC 0505	Agribusiness Management*	3	_____

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

AREA OF CONCENTRATION COURSES (12 credits; 6 credits must be in courses at 600 or above with maximum 3 credits in Special Problems)

<u>Course Number</u>	<u>Course Title</u>	<u>Credits</u>	<u>Semester</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

ELECTIVES COURSES (6 credits; any graduate level courses 500 or above outside concentration)**

<u>Course Number</u>	<u>Course Title</u>	<u>Credits</u>
<u>Semester</u>		
_____	_____	_____
_____	_____	_____

**Courses must be approved by Advisory Committee.

Professional Development Project Title: _____

Approval Signatures

<u>Name</u>	<u>Signature</u>
_____ Major Professor*	_____ Approved
_____ Advisory Committee Member*	_____ Approved
_____ Advisory Committee Member*	_____ Approved
_____ Advisory Committee Member	_____ Approved
_____ Advisory Committee Member	_____ Approved
_____ College Dean*	_____ Approved
_____ Date of Admission to Candidacy	_____ Dean, Graduate Programs

*Required Signature

(Distribution as follows: Registrar, Dean of Graduate Programs, School Dean, Major Professor, Department Head and Student)

Tuskegee University

Department of Agricultural and Environmental Sciences

Plan of Graduate Study

For Master of Sciences (Non-Thesis) in Agricultural and Resource Economics

Name of Student: _____
First Middle Last

Previous Record: _____
Degree Major University/Date

Department Enrolled: _____

Major Professor: _____
Name Department Telephone Number

Courses Proposed: (List only graduate courses)

CORE COURSES (14 credits)

Table with 4 columns: Course Number, Course Title, Credits, Semester. Rows include AGEC 0615, AGSC 0600, AGSC 0604, IBSC 0601, AGSC 0699, and ECON 0512.

*May be substituted with equivalent, such as EVSC 0501 - Biostatistics II)

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

AREA OF CONCENTRATION COURSES (12 credits; 6 credits must be in courses at 600 or above with maximum 3 credits in Special Problems)

Table with 4 columns: Course Number, Course Title, Credits, Semester. Row includes AGEC 0505 Agribusiness Management.

ELECTIVES COURSES (6 credits; any graduate level courses 500 or above outside concentration**)

Table with 4 columns: Course Number, Course Title, Credits, Semester.

**Courses must be approved by Advisory Committee.

Professional Development Project Title: _____

Approval Signatures

<u>Name</u>	<u>Signature</u>
_____ Major Professor*	_____ Approved
_____ Advisory Committee Member*	_____ Approved
_____ Advisory Committee Member*	_____ Approved
_____ Advisory Committee Member	_____ Approved
_____ Advisory Committee Member	_____ Approved
_____ College Dean*	_____ Approved
_____ Date of Admission to Candidacy	_____ Dean, Graduate Programs

*Required Signature

(Distribution as follows: Registrar, Dean of Graduate Programs, School Dean, Major Professor, Department Head and Student)

CURRICULUM SHEET FOR GRADUATE STUDENTS

CORE CURRICULUM FOR MASTER OF SCIENCES in Agricultural and Resource Economics non-thesis DEGREE.

REQUIRED CORE COURSES 14 credits):

AGEC 0615	Quantitative Methods (or equivalent or EVSC 0501 Biostats II)	3 credits
AGEC 0505	Agribusiness Management	3 credits*
AGSC 0600	Non-Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis Graduate Project Seminar II	1 credit
IBSC 0601	Research Ethics in Bioscience	3 credits*
AGSC 0699	Non-Thesis Graduate Project	3 credits
ECON 0512	Introduction to International Trade	3 credits
TOTAL CORE		17 credits

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

AREA OF CONCENTRATION **9 credits**

Students are required to complete 12 credits from his/her respective concentration of which **6 credit hours must be in courses at 600 or above.**

ELECTIVES **6 credits**

Students are required to complete 6 credit hours of electives comprising any graduate level courses 500 or above outside his/her respective concentration approved by the Advisory Committee.

TOTAL CREDIT HOURS REQUIRED 32 credits

AGRICULTURAL AND RESOURCE ECONOMICS (AGEC)

AGEC 0553	Macroeconomics and Applications in Agriculture	3 credits
AGEC 0604	Microeconomics Theory and Applications to Agriculture	3 credits
AGEC 0622	Research Methodology	3 credits

****Note: At the time of program development the listed courses comprise AGEC courses; however, any courses developed hereafter and meet the requirements indicated may be used to fulfill the concentration requirement indicated above.**

VII. Course Titles and Descriptions

COURSE DESCRIPTIONS

REQUIRED CORE COURSES

(Master of Sciences Non-Thesis Option)

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.

AGEC 505. AGRIBUSINESS MANAGEMENT: 2nd Semester. Lect. 3. Economic principles applied to organization and operations of farms; introduction to farm financial management techniques.. 3 credits.

AGEC 615. 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.

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).

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 bioscientists. 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.

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.

CONCENTRATION COURSES

AGRICULTURAL AND RESOURCE ECONOMICS (AGEC)

AGEC 553. MACROECONOMICS AND APPLICATIONS IN AGRICULTURE: 1st Semester. Lect. 3. An advanced look at theory and applications to agriculture of the circular flow framework, supply and demand in the macroeconomy, 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. Prerequisites: ECON 353.

AGEC 604. MICROECONOMICS THEORY AND APPLICATIONS TO AGRICULTURE: 2nd Semester. Lect. 3. This is an advanced microeconomics course that develops the theoretical structure of microeconomics principles and application to economic policy and decision making. The course covers the microeconomics of consumer choice, theory of the firm, general equilibrium, welfare economics, externalities and public goods. Prerequisites: ECON 352.

AGEC 622. RESEARCH METHODOLOGY. 2nd Semester. Lect. 3. 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. 3 credits.

CURRICULUM SHEET FOR GRADUATE STUDENT

CORE CURRICULUM FOR MASTER OF SCIENCES in Animal Sciences non-thesis DEGREE.

REQUIRED CORE COURSES 14 credits):

EVSC 0501	Biostats II (or equivalent or AGECE 0615 – Quantitative Methods)	3 credits
AGECE 0505	Agribusiness Management	3 credits*
AGSC 0600	Non-Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis Graduate Project Seminar I	1 credit
IBSC 0601	Research Ethics in Bioscience	3 credits*
AGSC 0699	Non-Thesis Graduate Project	3 credits
TOTAL CORE		14 credits

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

AREA OF CONCENTRATION **12 credits**

Students are required to complete 12 credits from his/her respective concentration of which **6 credit hours must be in courses at 600 or above with maximum of 3 credits for APSC 630.**

ELECTIVES **6 credits**

Students are required to complete 6 credit hours of electives comprising any graduate level courses 500 or above outside his/her respective concentration approved by the Advisory Committee.

TOTAL CREDIT HOURS REQUIRED 32 credits

ANIMAL AND POULTRY SCIENCES (APSC)

APSC 0501	International Animal Agriculture	3 credits
APSC 0503	Physiology of Production	3 credits
APSC 0510	Lab Animal Management	3 credits
APSC 0521	Molecular and Immunogenetics	3 credits
APSC 0531	Companion Animal Nutrition	3 credits
APSC 0540	Animal Biotechnology	3 credits
APSC 0550	Advanced Animal Breeding & Quantitative Genetics	3 credits
APSC 0600	Advanced Reproductive Physiology	4 credits
APSC 0601	Nutrition Toxicology	3 credits
APSC 0602	Ruminology	3 credits
APSC 0603	Advanced Animal & Poultry Nutrition	3 credits
APSC 0621	Immunogenetics	3 credits
APSC 0630	Special Problems in Animal Sciences	

****Note: At the time of program development the listed courses comprise APSC courses; however, any courses developed hereafter and meet the requirements indicated may be used to fulfill the concentration requirement indicated above.**

CONCENTRATION COURSES
ANIMAL AND POULTRY 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 510. 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 521. 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 531. 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 540. 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 600 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 601. 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 contrasted 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.

CURRICULUM SHEET FOR GRADUATE STUDENT

CORE CURRICULUM FOR MASTER OF SCIENCES in Environmental Sciences non-thesis DEGREE.

REQUIRED CORE COURSES 14 credits):

EVSC 0501	Biostats II (or equivalent or AGECE 0615 – Quantitative Methods)	3 credits
AGECE 0505	Agribusiness Management	3 credits*
AGSC 0600	Non-Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis Graduate Project Seminar II	1 credit
IBSC 0601	Research Ethics in Bioscience	3 credits*
AGSC 0699	Non-Thesis Graduate Project	3 credits
TOTAL CORE		14 credits

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

AREA OF CONCENTRATION **12 credits**

Students are required to complete 12 credits from his/her respective concentration of which **6 credit hours must be in courses at 600 or above with a maximum of 3 credits for EVSC 695.**

ELECTIVES **6 credits**

Students are required to complete 6 credit hours of electives comprising any graduate level courses 500 or above outside his/her respective concentration approved by the Advisory Committee.

TOTAL CREDIT HOURS REQUIRED 32 credits

ENVIRONMENTAL SCIENCES

EVSC 0504	Environmental Science II	3 credits
EVSC 0507	Introduction to Geographic Information Systems	3 credits
EVSC 0510	Soil Physics	3 credits
EVSC 0520	Introduction to Epidemiology	3 credits
EVSC 0522	Introduction to Toxicology	3 credits
PLSS/EVSC 0555	Soil Chemistry	3 credits
PLSS/EVSC 0590	Soil/Environmental Microbiology	3 credits
EVSC 0626	Soil Testing and Plant Analysis	3 credits
EVSC 0695	Special Topics in Environmental Sciences	3 credits

****Note: At the time of program development the listed courses comprise EVSC courses; however, any courses developed hereafter and meet the requirements indicated may be used to fulfill the concentration requirement indicated above.**

CONCENTRATION COURSES

ENVIRONMENTAL SCIENCES

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.

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.

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.

CURRICULUM SHEET FOR GRADUATE STUDENT

CORE CURRICULUM FOR MASTER OF SCIENCES in Plant and Soil Sciences non-thesis DEGREE.

REQUIRED CORE COURSES 14 credits):

EVSC 0501	Biostats II (or equivalent or AGECE 0615 – Quantitative Methods)	3 credits
AGECE 0505	Agribusiness Management	3 credits*
AGSC 0600	Non-Thesis Graduate Project Seminar I	1 credit
AGSC 0604	Non-Thesis Graduate Project Seminar II	1 credit
IBSC 0601	Research Ethics in Bioscience	3 credits*
AGSC 0699	Non-Thesis Graduate Project	3 credits
TOTAL CORE		14 credits

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

AREA OF CONCENTRATION **12 credits**

Students are required to complete 12 credits from his/her respective concentration of which **6 credit hours must be in courses at 600 or above.**

ELECTIVES **6 credits**

Students are required to complete 6 credit hours of electives comprising any graduate level courses 500 or above outside his/her respective concentration approved by the Advisory Committee.

TOTAL CREDIT HOURS REQUIRED **32 credits**

PLANT AND SOIL SCIENCES

PLSS 0501	Field and Forage Crop Production	3 credits
PLSS 0510	Soil Physics	3 credits
PLSS 0513	Entomology	3 credits
PLSS 0521	Soil and Water Conservation	3 credits
PLSS 0522	Physiology of Plant Growth & Development	3 credits
PLSS 0525	Mineral Nutrition and Soil Fertility	3 credits
PLSS 0555	Soil Chemistry	3 credits
PLSS 0590	Soil/Environmental Microbiology	3 credits
PLSS 0626	Soil Testing and Plant Analysis	3 credits

PLSS 0631	Advanced Fruit Science	3 credits
PLSS 0650	Phytohormone and Vitamins	3 credits
PLSS 0676	Physical Chemistry and Mineralogy of Soils	3 credits
PLSS 0680	Advanced Plant Breeding	3 credits
PLSS 0681	Advanced Vegetable Crops	3 credits
PLSS 0695	Special Topics in Environmental, Natural Resource and Plant Sciences	3 credits

****Note: At the time of program development the listed courses comprise PLSS courses; however, any courses developed hereafter and meet the requirements indicated may be used to fulfill the concentration requirement indicated above.**

CONCENTRATION COURSES

PLANT AND SOIL 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 plasmids 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, the students should have a working knowledge of basic recombinant technology, should have an introductory knowledge of more specialized techniques, and should be familiar with the 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 the structure and nature of clay minerals and physical chemistry techniques to investigate physico-chemical properties of soils. Prerequisites: PLSS 0626 and Permission of instructor.

PLSS 0680. ADVANCED PLANT BREEDING. 2nd Semester, odd years. Lect. 2, Lab 3, 3 credits. A study of the 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.

Guidelines for Preparation of Special Project Paper and Manuscript for the Master of Science - Non-Thesis Option.

General Directions and Format

Please submit one copy of your project paper to the office of the Department Head using 1” margins, font size 12 Times New Roman font, and no right-margin justification in Microsoft Word.

A. Format

The following format must be utilized: title pages, abstract, text, (refers to those that are aligned with a journal article, such as Introduction, Materials, Methods, etc. This portion of the document should be 5-7 pages) endnotes, appendix, references, tables, and/or figures. Your entire project paper should be a minimum of **20 pages** (15-13 of which can include a "Literature Review,"; and does not include title page or abstract page, but includes text, references, appendices, and tables/figures) in length.

Author Information/Review Process For the 5-7 Page Manuscript

The proceedings are an open peer review publication, and therefore names and other information of authors are not considered confidential when reviewing academic manuscripts. Academic manuscripts that have **poor readability** will not be included in the proceedings.

Title Page

The title page should include the following information: title of manuscript; authors’ names and affiliations; name, address, phone number, fax number, and email address of contact author.

Abstract

The title of the manuscript and a **150-word** abstract (single-spaced, 12-point font size) should be included. The abstract should cover what the study is about, key methodology, key results, and key conclusion.

Note: Do not put citations, sub-headings, or key words in the abstract. Place your abstract on a separate sheet, numbered as page 1. Therefore, your introduction should begin on page 2.

Text

The text should be double-spaced using 1” margins and font size 12 Times New Roman font, begin on page 2 and end on page 16 (all inclusive). **Main headings** should be centered, bold, and only the initial letters should be capitalized. **Secondary headings** should be set flush with the left margin in bold with initial letters capitalized and should not be underlined. **Tertiary headings** should be set flush with the left margin, bold and italicized, with initial letters capitalized, and should not be underlined. **Note:** (1) One- or two-sentence paragraphs are unacceptable. (2) Use % instead of percent within the text.

Equations should be numbered consecutively, and standard typeface should be used for mathematical notations to the extent possible. Minimize as much as possible mathematical notations in the text. Extensive mathematical formulae should be placed in an appendix. The **recommended sections** in the text are the following: introduction (including purpose and objectives); literature review (or equivalent); methodology (or methods and procedures or

materials and methods); results and discussion (or results separate from discussion), and conclusion (i.e., a summary of major findings, implications, and/or recommendations).

Citations within Text

All references must be cited within the text. This can be done in several ways, for example, (1) in parenthesis, put the author's last name followed by a comma and publication year; (2) put author's last name followed by the year in parentheses; (3) when you quote directly, in parenthesis put the author's last 2 name followed by a comma and publication year, and then another comma and page number OR put the author's last name outside the parentheses and place the year followed by a comma as well as the page number in parentheses. Quotation marks should be used for short quotes. For long quotes, authors should indent quote and use single space.

Depending on the citation, the citation should appear as: "Mills (2004) reported that..." or "Analysis on sampling has been extensively discussed in the literature (Williams, 2003)" or "Johnson (1999, p. 13) states ..." or "IPM is not extensively practiced by SLRFs in Alabama" (Tackie et al., 2009, p. 6).

Place a series of citations in alphabetical order, separately by semicolons in parenthesis, for example, (Feng, 1997; Gwartney and Lawson, 2003; Hanke and Walters, 1997; Iyoha and Oriakhi, 2002).

For works of two authors, cite both authors last names. For works of three or more authors use first author's last name followed by "et al."

If an author has two or more works in the same year, identify them by attaching letters of the alphabet, for example, Jones (2004a); Jones (2004b); Jones (2004c).

Endnotes

Endnotes should be placed at the end of the text and before the appendix (single-spaced). It is better to minimize the use of endnotes as integrating them into the text makes easier reading.

Appendix

Appendix should be placed after the endnotes before the references (single-spaced). It is advisable to sparingly use appendices.

References

References should be placed after the appendices before the tables (single-spaced). References should be listed alphabetically by last name of author and author's first and middle initials. If there are two or more authors the second and subsequent authors should have their first and middle initials come first, then their last names. If an author has two or more works in different years, mention or reference the most recent work first, for example, Williams (2008); Williams (2004). Please do not use abbreviations in the References, for example, et al. or abbreviated journal titles. For journals include volume, issue number, and page numbers. The first line of each reference should be flushed to the left margin and the subsequent lines should be indented.

The authors should make sure that there is a one-to-one correspondence between the citations (names and years) in the text and those in the References.

Tables

Tables should be placed on separate pages after references (single-spaced). Smaller font size (not below 10-point) is allowed for tables. **Please keep tables simple. Do not “box” tables.** Indicate positions of tables in text as follows, for example (Table 3).

Mukhoti, B. (1987). “The International Monetary Fund and Low-Income Countries.” Foreign Agricultural Economic Report No. 224, USDA-Economic Research Service. Washington, DC: U.S. Government Printing Service.

Paper Presented at Conference (Not Published):

Kone-Coulibaly, S., M. Egnin, and G. He. (2003). “Expression Profiling of Differentially Expressed Genes in Yam (*Dioscorea rotundata*) During Post-Harvest Storage.” Paper Presented at the 61st Annual Professional Agricultural Workers Conference, Tuskegee University, Tuskegee, AL.

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