A Handbook of Information and Regulations for Graduate Students

Please take time to keenly read this document and let it serve as one of your key references and guide as you pursue your graduate studies in the Department of Agricultural and Environmental Sciences at Tennessee State University.

If you have any questions please feel free to contact:

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# TIMETABLE FOR GRADUATE DEGREE SEEKING STUDENTS

(I) Timetable for M.S. Degree Seeking Students (Thesis Option)

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<tr>
<th>Deadline</th>
<th>Program Item</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The week prior to start of classes</td>
<td>Orientation (Graduate School, International Office)</td>
<td>The Graduate Coordinator is temporary advisor to new graduate students without advisor.</td>
</tr>
<tr>
<td>During the first or second week of classes in entering semester</td>
<td>Welcome and Orientation specific to the Department of Agric. &amp; Environ. Sciences</td>
<td>Meet with faculty, staff and administrators. Discussion of guidelines and policies (Q &amp; A).</td>
</tr>
<tr>
<td>During the first or second week of classes in entering semester</td>
<td>Assign/visit with major advisor/research mentor</td>
<td>The major advisor becomes the permanent academic and thesis advisor (if applies). Graduate coordinator will facilitate process.</td>
</tr>
<tr>
<td>Within four to six weeks of classes in entering semester</td>
<td>All graduate students should have settled for a major advisor/research mentor</td>
<td>Graduate coordinator will assist the student in identifying and assigning major advisor/research mentor.</td>
</tr>
<tr>
<td>Before the end of First semester</td>
<td>Appoint thesis committee (Four, including major advisor) Present and Submit thesis research proposal</td>
<td>Seek approval from graduate coordinator, Department chair, the Dean and graduate school. A short presentation of proposal to the faculty &amp; students.</td>
</tr>
<tr>
<td>During second semester</td>
<td>Submit research proposal to the Graduate School; Initiate research after proposal approval</td>
<td>Work closely with research mentor &amp; thesis committee to set goals and research timeline/timetable.</td>
</tr>
<tr>
<td>After completing 9 credit hours but before completing 15 credit hours</td>
<td>Complete program of study and Advancement of Candidacy</td>
<td>Program of study must be approved by the student’s advisory committee and the Department chair.</td>
</tr>
<tr>
<td>During or prior to last semester, Follow guidelines provided in Graduate Handbook. Observe graduate calendar.</td>
<td>Complete thesis, schedule date for thesis defense</td>
<td>Student in consultation with thesis advisor, must take all steps to complete thesis.</td>
</tr>
<tr>
<td>During students’ last semester of enrollment. Follow graduate calendar and observe deadlines.</td>
<td>Present thesis research in Departmental seminar followed by oral examination (thesis defense)</td>
<td>Schedule, and inform department personnel, two weeks prior to presentation/oral defense.</td>
</tr>
<tr>
<td>During students’ last semester of enrollment</td>
<td>Take final oral examination</td>
<td>After thesis is completed and there is general consensus with research mentor/thesis advisor.</td>
</tr>
<tr>
<td>During students’ last semester of enrollment</td>
<td>Submit Thesis to Grad. School Follow thesis submission guidelines by the Grad. School.</td>
<td>Approved by thesis committee, Departmental chair and Dean.</td>
</tr>
<tr>
<td>After approval for graduation by the graduate school or during your final week as graduate student/graduate Res. assistant</td>
<td>Submit to graduate coordinator a brief narrative of your graduate experience in the Dept. of Ag. Sciences at TSU</td>
<td>Comments will be used to gauge progress and/or make adjustments to improve the graduate program in agricultural sciences.</td>
</tr>
<tr>
<td>Deadline</td>
<td>Program Item</td>
<td>Comments</td>
</tr>
<tr>
<td>----------</td>
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<td>----------</td>
</tr>
<tr>
<td>The week prior to start of classes</td>
<td>Orientation (Graduate School, International Office)</td>
<td>The Graduate Coordinator is temporary advisor to new graduate students without advisor</td>
</tr>
<tr>
<td>During the first or second week of classes in entering semester</td>
<td>Welcome and Orientation specific to the Department of Agric. &amp; Environ. Sciences</td>
<td>Meet with faculty, staff and administrators. Discussion of guidelines and policies (Q &amp; A)</td>
</tr>
<tr>
<td>During the first or second week of classes in entering semester</td>
<td>Assign/visit with major advisor</td>
<td>The major advisor becomes the permanent academic and thesis advisor (if applies). Graduate coordinator will facilitate process.</td>
</tr>
<tr>
<td>Within four to six weeks of classes in entering semester</td>
<td>All graduate students should have settled for a major advisor</td>
<td>Graduate coordinator will assist the student in identifying and assigning major advisor</td>
</tr>
<tr>
<td>Before the end of First semester</td>
<td>Appoint examining committee (Four, include major advisor and one each from Agribusiness, plant science and animal science, respectively)</td>
<td>Seek approval from graduate coordinator, Department chair, the Dean and graduate school.</td>
</tr>
<tr>
<td>After completing 9 credit hours but before completing 15 credit hours</td>
<td>Complete program of study and Advancement of Candidacy</td>
<td>It must be approved by the student’s advisory committee and the Department Head.</td>
</tr>
<tr>
<td>Near the end of course work (preferably)</td>
<td>Register for AGSC 5350</td>
<td>Course is required</td>
</tr>
<tr>
<td>Preferably before the end of final semester</td>
<td>Schedule comprehensive Examination, written and oral</td>
<td>Must take AGSC 5350. Required course for non-thesis option before scheduling comprehensive examination</td>
</tr>
<tr>
<td>Presentation of research paper</td>
<td>Comprehensive Examination, written and oral.</td>
<td>Committee members, faculty, students, advisor submits result to Grad. School.</td>
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</table>
## (III) Timetable for Doctoral or Ph.D. Degree Seeking Students

<table>
<thead>
<tr>
<th>Deadline</th>
<th>Program Item</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The week prior to start of classes</td>
<td>Orientation (Graduate School, International Office, Department of Agric. &amp; Environ. Sci.)</td>
<td>The Graduate Coordinator is temporary advisor to new graduate students seeking research mentors.</td>
</tr>
<tr>
<td>First week of classes in entering semester</td>
<td>Assign/visit with major advisor /research mentor</td>
<td>The major advisor becomes the permanent academic and thesis advisor (if applies). Graduate coordinator will facilitate process.</td>
</tr>
<tr>
<td>Within four to six weeks of classes in entering semester</td>
<td>All graduate students should have settled for a major advisor /research mentor</td>
<td>Graduate coordinator will assist the student in identifying and assigning major advisor /research mentor.</td>
</tr>
<tr>
<td>After completing 9 credit hours but before completing 15 credit hours</td>
<td>Complete program of study and Advancement of Candidacy</td>
<td>Program of study must be approved by the student’s advisory committee and the Department chair. Submit program of study to Graduate school</td>
</tr>
<tr>
<td>Before the end of First semester</td>
<td>Appoint dissertation committee and start discussing research ideas and proposal with advisor</td>
<td>Work closely with research mentor &amp; thesis committee to complete research proposal.</td>
</tr>
<tr>
<td>During second semester</td>
<td>Present research proposal and submit the proposal to the Graduate School; Initiate research after proposal approval</td>
<td>Work closely with research mentor &amp; thesis committee to set goals and research timeline/timetable.</td>
</tr>
<tr>
<td>Immediately after completion of course work</td>
<td>Schedule preliminary exam, written and then oral</td>
<td>Work closely with advisor to schedule exams.</td>
</tr>
<tr>
<td>During or prior to last semester, Follow guidelines provided in Graduate Handbook. Observe graduate calendar.</td>
<td>Complete dissertation, schedule date for dissertation defense</td>
<td>Student in consultation with dissertation advisor, must take all steps to complete dissertation.</td>
</tr>
<tr>
<td>During students’ last semester of enrollment. Follow graduate calendar and observe deadlines.</td>
<td>Present dissertation research in Departmental seminar followed by oral examination (Dissertation defense)</td>
<td>Schedule, and inform department personnel, two weeks prior to presentation/oral defense.</td>
</tr>
<tr>
<td>During students’ last semester of enrollment</td>
<td>Take final oral examination</td>
<td>After dissertation completed and there is general consensus with research mentor/advisor.</td>
</tr>
<tr>
<td>During students’ last semester of enrollment</td>
<td>Submit dissertation to Graduate School. Follow dissertation submission guidelines by the Grad. School.</td>
<td>Approved by dissertation committee, Departmental chair and Dean.</td>
</tr>
<tr>
<td>After approval for graduation by the graduate school or during your final week as graduate student/graduate Res. assistant</td>
<td>Submit to graduate coordinator a brief narrative or exit survey of your graduate experience in the Dept. of Ag. Sciences at TSU</td>
<td>Comments will be used to gauge progress and/or make adjustments to improve the graduate program in agricultural sciences.</td>
</tr>
</tbody>
</table>
INTRODUCTION

This handbook has been prepared to provide information for new and continuing students in Agricultural Sciences graduate programs at Tennessee State University. The handbook outlines the graduate programs and their requirements, regulations, and guidelines. Information included is supplementary to the university policy as explained in detail in the latest issue of the Graduate Catalogue, and is subject to change with changes in policy made by the Graduate Council and the Department of Agricultural and Environmental Sciences (DAES). The handbook may also be used as a guide for placement of graduate students.

This handbook is intended as a departmental supplement to the published information in the Graduate Catalog. It is required that graduate students in the DAES familiarize themselves with the policies of both the Graduate School and the DAES. In consultation with their advisors and the graduate coordinator, students should take the initiative to ensure that their academic requirements are met in a timely manner.

THE UNIVERSITY AND ITS SETTINGS

Tennessee State University (TSU), an 1890 land-grant institution, is a major state-supported, urban comprehensive university governed by the Tennessee Board of Regents. This unique combination of characteristics - land-grant, urban and comprehensive – differentiates the university from all others in the state and distinctively shapes its instructional, research, and public service programs. In carrying out its diverse mission, the university serves the city of Nashville and Middle Tennessee, the state of Tennessee, the nation, and the international community.

As an 1890 land-grant institution, Tennessee State University provides instructional programs, statewide cooperative extension programs, and research in the food and agricultural sciences of an international dimension. The academic programs in DAES fulfill the 1890 land-grant mission of the University through instruction, research and extension. Thus, the programs are consistent with and further the mission of the University. They also satisfy the academic program criteria established by the commission on the colleges of the Southern Association of Colleges and Schools. The programs meet a clearly defined niche in that Tennessee State University has the only agricultural program in
the state that produces a large number of African-American graduates. There is a School Strategic Plan that was developed in conjunction with the University’s Academic Master Plan and five-year Strategic Plan. These may be accessed in http://www.tnstate.edu/academic_affairs/documents/AcademicMasterPlan.pdf and http://www.tnstate.edu/dipa/documents/StrategicPlan.pdf, respectively. The university offers advanced studies/degrees in many fields including Agricultural and Consumer Sciences, Business, Education, Engineering, Physical and Biological Sciences, Health Sciences, Nursing, Social Sciences and Humanities. As a result, there are strong course offerings and well-qualified faculty in a variety of other disciplines that are complementary to Agricultural Sciences. Many of the disciplines that include chemistry and biology are also housed in the College of Agriculture, Human and Natural Science.

**The Department of Agricultural and Environmental Sciences is part of the College of Agriculture, Human and Natural Sciences**, at Tennessee State University. The Department of Agricultural and Environmental Sciences was established in 1987 as one of the two departments in the then School of Agricultural and Consumer Sciences. It resulted from the restructuring of the agricultural program that included three departments in agriculture: animal sciences, plant sciences, and rural development. These departments were combined into the present, “Department of Agricultural and Environmental Sciences”. The department offers academic programs at both undergraduate and graduate levels. Scholarly research and extension is also an important component of the department. There are ten research laboratories on the main campus housed in Lawson Hall Annex and Farrell-Westbrook agricultural research buildings. These laboratories house state-of-the-art equipment that are essential for cutting edge research. Also available for research are three field research stations; the main campus agricultural demonstration and research center; the Cheatham County agricultural demonstration and research center; and the Nursery Crops Research Station at McMinnville which also houses several state-of-the-art research labs.

**GRADUATE EDUCATION IN THE DEPARTMENT OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES**
Graduate education in the Department of Agricultural and Environmental Sciences stresses development of superior professional competence suited to the demands of the public research, education, and business environments. Desirable prerequisites to graduate study are:

1. Desire to understand and solve the complex and changing biological, environmental, and economic problems faced by agriculture, agribusiness and rural society.
2. The desire and ability to learn methods of rigorous logical analysis.
The graduate program is administered at the Master of Sciences (M.S.) and the Doctor of Philosophy (Ph.D.) levels. The program is designed to:

1. Prepare research scholars in the increasingly complex scientific field of agriculture and related areas;
2. Prepare scholars for rewarding careers in higher education, government, the agricultural industry, and international organizations that are involved in agriculture and rural development activities;
3. Prepare scholars for leadership roles in professional agriculture;
4. Prepare scholars for further training in doctoral programs; and
5. Provide advanced training in agricultural education for graduates working in industry, secondary schools and vocational agriculture.

The graduate program of the Department of Agriculture and Environmental Sciences is designed to prepare students for careers in the private, academic and government sectors. Experience and training are provided through (1) courses within traditional subject matter areas as well as on the frontiers of knowledge in the field, (2) seminars and discussions designed to sharpen the student’s ability to express ideas on subjects in their area of interest, and (3) research experiences designed to develop competency in applications of theory and the use of appropriate quantitative methods.

**MASTER’S DEGREE PROGRAM**

Master’s degree program in the Department of Agriculture and Environmental Sciences qualify students for a degree of “Master of Science in Agricultural Sciences” with concentrations in Agribusiness Management and Analysis, Food Marketing and Supply Chain Management, Animal Science, Agricultural Education, and Plant Science. The program provides development of knowledge and professional skills for related careers in agribusiness, government service, food and animal industries and extension service and prepares students for Ph.D. degree programs. The Master’s degree program in Agricultural and Environmental sciences provides a flexible program, which can be tailored to meet each student’s unique situation.

**MASTER OF SCIENCE DEGREE OPTIONS**

Currently two types of master’s degree programs are offered. These include:

(1) **Thesis option:**

In the thesis option student conducts research and writes a thesis, designed primarily for students interested in research who plan to pursue a Ph.D. degree or will occupy research positions (research and
development) following the completion of their training. The option develops the students’ theoretical and research foundation for further graduate studies in addition to enhancing knowledge and skills in agricultural and environmental sciences. This program requires 30-33 approved semester credit hours of coursework including a four (4) credit hour of formal thesis. Students in this program are expected to complete a thesis (four credit hours) plus a minimum of 26-29 credit hours of course work, 12 hours of which must be core courses. The thesis is a report of original and groundbreaking scholarly research conducted by the student. The thesis research will be conducted under supervision of the student’s major professor and advisory committee.

Upon completion of the thesis, the student’s final oral examination can be scheduled. Details of oral examination are given in section below under “Graduate Examinations”. In addition to the oral examination, students are encouraged to present seminars based on their work. They are also encouraged to write papers for presentation at professional meetings and for submission to professional journals.

(2) Non-thesis option

Under this option, the program requires 35 approved semester credit hours of course work. Upon completion of the course work, each student choosing the non-thesis option must take a comprehensive written and oral examination administered by the student’s advisory committee and other faculty members representing appropriate subject matter areas.

The core courses mentioned above in the program are as follows:

| PROGRAM |
|-----------------|-----------------|
| **THESIS OPTION** | **NON-THESIS OPTION** |
| Major core | 12 hrs | Major core | 11 hrs |
| AGSC 5110 Research Methods | 3 hrs | AGSC 5110 Research Method | 3 hrs |
| AGSC 5610-5620 Seminar | 2 hrs | AGSC 5610-5620 Seminar | 2 hrs |
| AGSC 5120 Thesis Writing | 4 hrs | AGSC 5350 Cont. Issues & Prob. | 3 hrs |
| Concentrations (minimum) | 12 hrs | Concentrations (minimum) | 15 hrs |
| Electives (maximum) | 6 (9*) hrs | Electives maximum | 9 hrs |
| **Grand Total (with Thesis) =** | **30-33* hrs** | **Grand Total (without Thesis) =** | **35 hrs** |

* Applies to concentrations in (1) Agribusiness Management and Analysis and (2) Food Marketing and Supply Chain Management
Students choosing the non-thesis option are required to take a minimum of 35 credit hours of course work. This will include course titled “Independent Study of the Contemporary Issues and Problems” (AGSC 5350). This course includes a study of current literature applicable to the practice of contemporary issues, problem(s) and their solution(s) in student’s area of concentration (Agribusiness Management and Analysis, Food Marketing and Supply Chain Management, Animal Science, Plant Science, Agriculture and Extension Education). Students should select a topic of their interest and complete work on the selected topic under the guidance of his or her advisor. If the completed work is approved by the advisor, then the student will make a request for oral examination.

Curriculum/Program of Study

I. Agribusiness Management and Analysis

Core Courses: Thesis option 12 hours or non-thesis option 11 hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGSC 5060</td>
<td>Statistics for Research Workers</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5110</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5120</td>
<td>Thesis Writing</td>
<td>4</td>
</tr>
<tr>
<td>Or AGSC 5350</td>
<td>Independent Study (For non-thesis option)</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5610-5620</td>
<td>Seminar</td>
<td>2</td>
</tr>
</tbody>
</table>

Required Courses: 12 hrs minimum with thesis or 15hrs minimum for non-thesis option

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGSC 5080</td>
<td>Agribusiness Management &amp; Market analysis</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5090</td>
<td>Food and Fiber Industry Economics &amp; Policy</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5100</td>
<td>Environmental Resource Econ. &amp; Management</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5300</td>
<td>Decision-making in Agribusiness-Quantitative App</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5310</td>
<td>Intl. Agric. Trade and Marketing</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 5330</td>
<td>Agribusiness Strategy</td>
<td>3</td>
</tr>
<tr>
<td>AGSC ____</td>
<td>Food Marketing&amp; Retail Management</td>
<td>3</td>
</tr>
</tbody>
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Electives: 9 hours maximum thesis or non-thesis

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGSC 6110</td>
<td>Managerial Economics</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 6020</td>
<td>Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BISI 6131</td>
<td>Management and Evaluation of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 5000</td>
<td>Foundations in Accounting</td>
<td>3</td>
</tr>
</tbody>
</table>
II. Food Marketing and Supply Chain Management

**Core Courses:** Thesis option 12 hours or non-thesis option 11 hours

- AGSC 5060  Statistics for Research Workers 3 credit hours
- AGSC 5110  Research Methods 3 credit hours
- AGSC 5120  Thesis Writing 4 credit hours
- Or AGSC 5350  Independent Study (For non-thesis option) 3 credit hours
- AGSC 5610-5620  Seminar 2 credit hours

**Required Courses:** 12 hrs minimum with thesis or 15hrs minimum for non-thesis option

- AGSC 5080  Agribusiness Management and Market Analysis 3 credit hours
- AGSC 5300  Decision Making in Agriculture – Quantitative Applications 3 credit hours
- AGSC 5310  International Agricultural Trade and Marketing 3 credit hours
- AGSC ___  Food Supply and value Chain Management 3 credit hours
- AGSC 5090  Food Industry Economics, Regulations and Policy 3 credit hours
- AGSC 5100  Environmental Resource Economics and Management 3 credit hours

**Electives:** 9 hours maximum thesis or non-thesis

- AGSC 6110  Managerial Economics 3 credit hours
- MGMT 6020  Behavior in Organizations 3 credit hours
- BISI 6131  Management and Evaluation of Information Systems 3 credit hours
- ACCT 5000  Foundations in Accounting 3 credit hours
- AGSC 5040  Program Planning and Evaluation 3 credit hours
- MGMT 6100  Logistic 3 credit hours

III. Program of Study for Agricultural Education Concentration:

**Core Courses:** Thesis option 12 hours or non-thesis option 11 hours

- AGSC 5060  Statistics for Research Workers 3 credit hours
- AGSC 5110  Research Methods 3 credit hours
- AGSC 5120  Thesis Writing 4 credit hours
Required Courses: 12 hrs minimum with thesis or 15 hrs minimum for non-thesis option

- AGSC 5010 Federal Relations to Vocational Education
- AGSC 5020 Occupational Studies in Vocational Education
- AGSC 5030 Organization and Vocational Education
- AGSC 5040 Program Planning & Evaluation in Vocational Education
- AGSC 5050 Special Problems in Vocational Education

Electives: 6 hours maximum with thesis or 9 hours maximum non-thesis

- AGSC 5080 Agribusiness Management & Market analysis
- AGSC 5090 Food and Fiber Industry Economics & Policy
- AGSC 5100 Environmental, Resource Econ. & Management
- AGSC 5140 Special Problems in Animal and Poultry Science
- AGSC 5150 Livestock Management
- AGSC 5220 Plant Growth Substances
- AGSC 5260 Soil and Plant Analysis
- EDCI 5260 Philosophy of Education
- EDCI 5270 Advanced Social Studies
- PSYC 5430 Advanced Educational Psychology

IV. Program of Study for Animal Science Concentration:

Core Courses: Thesis option 12 hours or non-thesis option 11 hours

- AGSC 5060 Statistics for Research Workers
- AGSC 5110 Research Methods
- AGSC 5120 Thesis Writing
- Or AGSC 5350 Independent Study (for non-thesis option)
- AGSC 5610-5620 Seminar

Required Courses: 12 hrs minimum with thesis or 15 hrs minimum for non-thesis option

- AGSC 5130 Animal Nutrition
- AGSC 5140 Special Problems in Animal and Poultry Science
AGSC 5150  Livestock Management  
AGSC 5160  Animal Genetics and Breeding  
AGSC 5170  Advanced Poultry Production and Management  

**Electives**: 6 hours maximum with thesis or 9 hours maximum for non-thesis

AGSC 5090  Food and Fiber Industry Economics & Policy  
AGSC 5100  Environmental Resource Economics & Management  
AGSC 5180  Soil Classification  
AGSC 5220  Plant Growth Substances  
AGSC 5260  Soil and Plant Analysis  

V. **Program of Study for Plant Science Concentration**:  

**Core Courses**: Thesis option 12 hours or non-thesis option 11 hours  
AGSC 5060  Statistics for Research Workers  
AGSC 5110  Research Methods  
AGSC 5120  Thesis Writing  
Or AGSC 5350  Independent Study (For non-thesis option)  
AGSC 5610-5620  Seminar  

**Required Courses**: 12 hrs minimum with thesis or 15 hrs minimum for non-thesis option  
AGSC 5180  Soil Classification  
AGSC 5190  Plant Breeding  
AGSC 5220  Plant Growth Substances  
AGSC 5230  Advanced Propagation of Horticultural Plants  
AGSC 5240  Advanced Homology  
AGSC 5260  Soil and Plant Analysis  

**Electives**: 6 hours maximum with thesis or 9 hours maximum for non-thesis  
AGSC 5090  Food and Fiber Industry Economics & Policy  
AGSC 5100  Environmental, Resource Econ. & Management  
AGSC 5130  Animal Nutrition  
AGSC 5150  Livestock Management  
AGSC 5160  Animal Genetics and Breeding
DOCTOR OF PHILOSOPHY DEGREE PROGRAM

The Ph.D. in Biological Sciences is an interdepartmental degree program offered by the Departments of Biological Sciences and Agricultural and Environmental Sciences in the College of Agriculture, Human and Natural Sciences. The PhD degree is offered with concentrations in Agricultural Biotechnology and Molecular Biology. Emphasis areas are in cellular and molecular biology; animal, plant and environmental sciences and biochemistry. Admission procedure for the Ph.D. program is outlined under the Department of Biological Sciences in the Tennessee State University catalogue. The major advisor will be appointed by the department offering the student’s primary emphasis. Course descriptions are listed under the respective Departments.

<table>
<thead>
<tr>
<th>Core Required Classes (17 credit hrs)</th>
<th>Credit Hrs</th>
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<tbody>
<tr>
<td>BIOL 5100 Literature and Methods in Research</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 5180 Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 5410, 5420 Advanced Biochemistry I, II</td>
<td>6</td>
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<tr>
<td>AGSC 5060 Statistics for Research Workers</td>
<td>3</td>
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<tr>
<td>BIOL 7010, 7020 Seminar</td>
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<tr>
<th>Biochemistry Cell and Molecular Biology (59 credit hrs)</th>
<th>Animal Science (59 credit hrs)</th>
<th>Plant Science (59 credit hrs)</th>
<th>Environmental Science (59 credit hrs)</th>
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</thead>
<tbody>
<tr>
<td>BIOL 5160 Environmental Genetics 3</td>
<td>AGSC 5130 Animal Nutrition 3</td>
<td>AGSC 5190 Plant Breeding 3</td>
<td>STAT 5210 Statistical Methods I 3</td>
</tr>
<tr>
<td>BIOL 5170 Advanced Genetics 3</td>
<td>AGSC 5140 Special Problems in Animal and Poultry Science 3</td>
<td>AGSC 7010 Advancements In Agricultural Biotechnology 3</td>
<td>BIOL 5180 Cell Biology 3</td>
</tr>
<tr>
<td>BIOL 5190 Ecology 3</td>
<td>AGSC 5150 Livestock Management 3</td>
<td>AGSC 7020 Economic, Regulatory &amp; Ethical Issues in Biotechnology 3</td>
<td>BIOL 5100 Literature and Methods in Research 3</td>
</tr>
<tr>
<td>BIOL 5200 General Physiology 3</td>
<td>AGSC 5160 Animal Genetics and Breeding 3</td>
<td>AGSC 7030 Gene Expression and Regulation In Higher Plants 3</td>
<td>BIOL 5160 Environmental Genetics</td>
</tr>
<tr>
<td>BIOL 5210 Embryology 3</td>
<td>AGSC 5170 Advanced Poultry Production and Management 3</td>
<td>AGSC 7040 Plant Tissue Culture Methods and Applications 3</td>
<td>BIOL 5190 Ecology 3</td>
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<tr>
<td>BIOL 5220 Advanced Parasitology 3</td>
<td>AGSC 7050 Biotechnology in Animal Reproduction 3</td>
<td>AGSC 7060 Advanced Soil Technology 3</td>
<td>BIOL 5400 Microbial Genetics 3</td>
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<tr>
<td>BIOL 5230 Arthropods and Diseases 3</td>
<td>AGSC 7020 Economic, Regulatory and Ethical 3 Issues in Biotechnology</td>
<td>AGSC 7070 Molecular Genetics Ecology 3</td>
<td>BIOL 5410 Molecular Genetics 3</td>
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<tr>
<td>BIOL 5240 Systemic Physiology 3</td>
<td>AGSC 7010 Advancements In Agricultural Biotechnology 3</td>
<td>AGSC 5220 Plant Growth Substances 3</td>
<td>AGSC 5260 Soil and Plant Analysis 3</td>
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<tr>
<td>BIOL 5300 Plant Physiology 3</td>
<td>BIOL 5210 Embryology</td>
<td>AGSC 5260 Soil &amp; Plant Analysis 3</td>
<td>AGSC 7060 Advanced Soil Technology 3</td>
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<tr>
<td>BIOL 5400 Microbial Genetics 3</td>
<td>BIOL 5210 Embryology</td>
<td>AGSC 5260 Soil &amp; Plant Analysis 3</td>
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<td>BIOL 5460 Immunology 3</td>
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<td>BIOL 7120 Molecular Biology</td>
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<td>BIOL 5470 Special Topics in Immunology 3</td>
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<td>BIOL 6040 Individual Studies 3</td>
<td>BIOL 5210 Embryology</td>
<td>BIOL 7410 Advanced Microbiology 3</td>
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<tr>
<td>BIOL 6100 Frontiers in Molecular Science 3</td>
<td>BIOL 5210 Embryology</td>
<td>CHEM 5600 Spectroscopic Methods in Microscopy 3</td>
<td>CHEM 5600 Spectroscopic Methods in Chemistry 3</td>
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<tr>
<td>BIOL 6110 Individual Research 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5280 Solid Waste Management 3</td>
<td>AGSC 6510 Advanced Geospatial Information Systems 3</td>
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<tr>
<td>BIOL 6250 Genomics 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5330 Water Quality Management 3</td>
<td>CVEN 5330 Water Quality Management 3</td>
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<tr>
<td>BIOL 6210 Introduction to Neuropharmacology 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5370 Environmental Chemistry 3</td>
<td>CVEN 5370 Environmental Chemistry 3</td>
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<tr>
<td>BIOL 6560 Techniques of Electron Microscopy 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5380 Environmental Impact Analysis 3</td>
<td>CVEN 5380 Environmental Impact Analysis 3</td>
</tr>
<tr>
<td>BIOL 7120 Molecular Biology 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5270 Ground Water Contamination 3</td>
<td>CVEN 5270 Ground Water Contamination 3</td>
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<tr>
<td>BIOL 7130 Molecular Genetics 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5350 Hazardous Waste Management 3</td>
<td>CVEN 5350 Hazardous Waste Management 3</td>
</tr>
<tr>
<td>BIOL 7170 Selected Topics in Molecular Genetics 3</td>
<td>BIOL 5210 Embryology</td>
<td>CVEN 5350 Hazardous Waste Management 3</td>
<td>CVEN 5350 Hazardous Waste Management 3</td>
</tr>
</tbody>
</table>
CERTIFICATE: APPLIED GEOSPATIAL INFORMATION SYSTEMS

Admission Process
Application for the certificate must hold a baccalaureate degree from an accredited institution of higher education and meet the Graduate School requirements for non-degree admission and retention as published in the University catalog. Requests for application forms and materials should be directed to the School of Graduate Studies and Research.

Certificate Requirement
To earn the Certificate in Applied Geospatial Information Systems, students must satisfactorily complete the following courses:

- AGSC 6510               Advanced Geospatial Information Systems
- AGSC 6520               Advanced Spatial Analysis
- AGSC 6530               Advanced Geospatial Metadata
- AGSC 6540               Advanced Spatial Database Design and Management
- AGSC 6550               Advanced Geospatial Information Systems Application and Design
- AGSC 6560               Advanced Global Positioning Systems

The certificate is awarded upon the successful completion of the six courses (18 semester credit hours). For more information, please call the Department of Agricultural and Environmental Sciences (615-963-5431) or Dr. Surendra Singh (615-963-5829).

ADMISSION STANDARDS AND PROCEDURE
(1) Admission Requirements and Completing an Application File-M.S. Degree in Agricultural and Environmental Sciences

Candidates must have the equivalent of the bachelor’s degree with a major in one of the agricultural sciences or related area and a minimum quality grade point average of 2.75 on a 4.00 point scale and a minimum score of 290 on the GRE (verbal & quantitative, or verbal, quantitative & subject), or 385 on the MAT or rank 30th percentile or higher in either GRE or MAT. An applicant with the bachelor’s degree in areas other than agricultural sciences may be recommended to graduate school for conditional admission and be required to take up to eighteen (18) credit hours of undergraduate prerequisite courses in agricultural disciplines, as recommended by the Department of Agriculture and Environmental Sciences Graduate Admissions Committee.
(2) Admission Requirements and Completing an Application File-Ph.D. Degree in Biological Sciences

Admission requires that the applicant have a bachelor's degree from a fully accredited four-year college or university, a minimal score of 1475 calculated from the Graduate GPA multiplied by 200 and added to the GRE combined verbal and quantitative scores, two letters of recommendation and a personal statement indicating emphasis area of interest. Applicants must meet a minimum GRE requirement of 290 (verbal and Quantitative). International students must request their undergraduate institutions to forward their official transcripts to WES (World Education Services) for evaluation after which WES should forward the evaluated transcript to TSU. Applicants should follow the following steps to initiate your application for admission to the Doctoral program:

(1) Visit the website:
   (http://www.tnstate.edu/agriculture/research_projects_competitive_agriculture.aspx) or http://www.tnstate.edu/agriculture/research_projects.aspx and familiarize with research interests of our graduate faculty;

(2) Identify the faculty member whom you feel is pursuing research of your interest and contact them directly. Forward a copy of your communication with the individual faculty to graduate coordinator;

(3) Submit application online at http://www.tnstate.edu/admissions/, including personal statement.

(4) Link to the School of Graduate Studies and Research at http://www.tnstate.edu/graduate/ for further details of graduate program and application for admission in the Graduate program.

(3) General Admission Guidelines

Students are admitted in the fall, spring, and summer semesters. Application forms and instructions are available from School of Graduate Studies and Research. Application requests and correspondence on admissions may also be sent via e-mail (gradschool@tnstate.edu). All applications for admission are made directly to the Graduate School. After determining that applicant meets the minimum standards for admission to the Graduate School (see the Graduate School catalog or website-www.tnstate.edu for these requirements) the application is passed on to the department for the recommendation for admission. These applications are reviewed by the department’s graduate program
admissions committee. The applicant must complete and submit all the items requested in the Graduate application package before the Admission Committee will make an acceptance decision.

Applicants are expected to include Graduate Record Examination (GRE) or Miller Analogy Test (MAT) scores as a part of the application. Therefore, applicants must have their GRE and MAT score reports sent directly to the School of Graduate Studies and Research.

Students may be admitted without GRE score only under special circumstances and will be required to take the examination and furnish scores during their first semester in residence (as part-time or full-time students)

University/ College Transcripts- All applicants, whether degree-seeking or not, must submit official transcripts of all post-secondary work including TSU, with the application. These transcripts must be obtained from the registrar of your college or university in sealed envelopes and attached to your application or mail directly to the school of Graduate Studies.

All applicants should have two letters of recommendations sent to the Chairperson of the Department of Agriculture and Environmental Sciences. In summary, a prospective candidate for the Master of Science program in Agricultural Sciences must first be admitted to the School of Graduate Studies and Research by following these steps:

- Read and follow the instructions on the application form.
- You may apply online: www.tnstate.edu
- E-mail inquiries to: gradschool@tnstate.edu
- File an application for admission on the approved application form. A non-refundable fee of $35.00 must be submitted with application for admission. This fee is payable by check or money order only, payable to Tennessee State University. Applicants for readmission are not required to pay the fee unless seeking a higher degree.

Submit your application to the School of Graduate Studies and Research online, or mail the completed application with other necessary documents to:

Tennessee State University,
School of Graduate Studies and Research,
3500 John A Merritt Blvd.
Nashville, TN: 37209-1561

Application Deadlines

Admission decisions are made throughout the year. Applicants may be admitted to begin study in fall, spring or summer semesters. The complete Application Package should be received as early as possible. Refer to the application for appropriate deadline.
To ensure consideration for admission to the graduate school, the application and other required
documents must be postmarked by these priority deadlines:

- July 1 - Fall semester
- November 1 - Spring semester
- April 1 - Summer semester
- March 15 - General Fall admission into the Ph.D. degree program

**Admission Decision**
The Department of Agriculture and Environmental Sciences receives a student’s application after the
School of Graduate Studies and Research has reviewed the application and found to have met general
admission requirements. Admission to this program is made by considering a combination of
performance indicator as follows:

1. Admission to the School of Graduate Studies and Research;
2. Undergraduate GPA of 2.75 and above based on a 4.0 scale;
3. Satisfactory test scores on the Graduate Record Examination (GRE) or Millers Analogy Test (MAT);
   and
4. An acceptable TOEFL score for international students only.

The Graduate committee of the Department of Agriculture and Environmental Sciences reviews the
application of each candidate who has been accepted into the University’s graduate program to
determine departmental admission status. The committee then recommends to the departmental
chairperson that a candidate be granted “conditional” or “unconditional” standing in the department or
be denied for admission.

**INTERNATIONAL STUDENTS:**
In addition to the above-mentioned requirements, international students whose first language is not
English must submit evidence of English proficiency. They must take the Test of English as a Foreign
Language (TOEFL) and request The Educational Testing Service (ETS) to send the results of the
TOEFL to the Graduate Studies and Research.

- A minimum TOEFL score of 500 (paper test) or 173 (computer-based test) or 61 (Internet-based test) is
  required.

In addition, official transcripts or authorized school records with a listing of courses and grades
received; and evaluated by a foreign educational credential agency (such as World Education Service),
at the student’s expense, before they can be accepted. Evaluation reports of transcripts must be sent
directly to the School of Graduate Studies and Research by the agency.
International students must also provide evidence of financial resources sufficient to provide tuition and fee for the academic year and the $35.00 non-refundable application fee.

All international students applying for admission who have a student visa shall submit a certificate from a licensed physician or the qualified medical authority verifying freedom from tuberculosis within thirty (30) days from the first day of classes. Failure to submit such certificate shall result in denial of further enrollment or admission. In the event that the student have tuberculosis or has potential tuberculosis requiring medical treatment, continued enrollment will be contingent upon the determination by a licensed physician that further enrollment does not present a risk to others and upon the student’s compliance with any prescribed medical treatment program.

**Note:**

- **It is mandatory that all F-1 students have health insurance upon enrollment for the duration of their studies. The policy must include a clause of Medical Evacuation and Repatriation of $10,000 each.**
- **After admission, copies of Visa or Alien Registration card must be submitted before student may enroll.**
- **Internationals transferring from another university/college must submit to their current school’s the "Immigration Information" forms for a release date, before processing of an I-20.**

**UNCONDITIONAL ADMISSION:**

Applicant granted full admission status is eligible to begin taking graduate level courses. To be eligible for unconditional admission to the master’s degree program in Agricultural Sciences, a candidate must have been accepted into the School of Graduate Studies, meet the basic departmental requirements as described above and have preparation in formal undergraduate courses or equivalent experience. These students are considered for assistantship.

**CONDITIONAL ADMISSION:**

A Conditional admission to the master’s degree program in Agricultural Sciences is given to prospective students satisfying all requirements for full admission but have not had undergraduate courses in agriculture or have undergraduate degree other than in agriculture. The prerequisites may be satisfied by any of the following methods: by taking the undergraduate courses or their equivalent in residences. All conditions must be met as specified, and courses taken in this status must be earned with a grade of “B” or higher, and must be completed within two academic semesters from time of enrollment in graduate school, unless otherwise specified by the department chairperson in writing. The prerequisite courses can be taken simultaneously with regular M.S. degree courses **with prior discussion with advisor** and the approval of the department chairperson. If the conditional admission was based on pending GRE or
MAT scores, then the conditions will be removed when such scores are met. **Once the student meets all requirements and attains unconditional status, they can then be considered for graduate assistantship.**

Application forms for Graduate Research Assistantships can be obtained from the Department of Agriculture and Environmental Sciences office and should be submitted as early as possible, but no later than July 1 for the fall semester, November 1 for spring and April 1 for summer sessions. Graduate Assistantship applications **are made directly to the department, not to the Graduate School**. The Graduate Admission Committee, which is appointed by the Head, Department of Agriculture and Environmental Sciences, will review applications for Graduate Research Assistantships and makes recommendations to the Department Chair.

**TRANSFER CREDIT POLICY**
At the Master’s level, a student may be allowed a maximum of twelve (12) semester credit hours from another accredited college or university. The transfer of credit form may be obtained online at www.tnstate.edu/grad or from the School of Graduate Studies & Research. The course work being considered for transfer must be evaluated by the Graduate coordinator/department Chair, School Dean and the Dean of Graduate School. Only courses in which the student earned grades of “B” or better, and which are taken within the degree program time limit, will be considered for transfer. Credits earned in partial fulfillment of a previously completed degree program at Tennessee State University or any other institution may not be transferred or used for credit in another degree program *(2009-2011 Graduate Catalog)*

**CLASS LOADS POLICY**
Full-time status is attained when the graduate student enrolls in at least nine (9) credit hours in one semester. When a student enrolls in any course for credit, the maximum class load for either the fall or spring semester shall be twelve (12) hours. Students may take up to fifteen (15) hours with an overload approval. The maximum load for either summer session I or summer session II shall be six credit hours. Students desiring to carry an over-load must have the endorsement of the Major Advisor, Dean of the School, and the Dean of the Graduate School *(2009-2011 Graduate Catalogs)*.

**SECOND MASTER’S DEGREE**
Students may not be simultaneously enrolled in two Master’s degree programs. Credits earned to fulfill requirements for the first Master’s degree may not be used to satisfy any of the requirements.
for the second Master’s degree, or reduce the number of hours for the second Master’s degree (2009-
2011 Graduate Catalogs).

PROGRAM OF STUDY AND ADVANCEMENT OF CANDIDACY
Each new graduate student is required to submit a formal program of study and advancement to
candidacy for approval. This program must be made with the advice and concurrence of his/her
academic advisor and graduate committee and must be submitted after completing nine (9) credit
hours of graduate course work. Program of study must be submitted for approval using the Program
of Study and Advancement to Candidacy form. Only courses appearing on the approved program
will be counted toward fulfilling degree requirements. Changes in the program may be made, using
the Change in Program or Personnel form with the approval of Student’s Graduate Committee and
the Graduate School.

The new graduate student is advised to arrive a few days before the start of classes to
become acquainted with the faculty and to meet with the graduate coordinator to prepare a course
schedule for the student’s first semester. If the student has not already selected a thesis advisor,
he/she is encouraged to select a permanent advisor within four to six weeks, secure this faculty
members approval. The student is encouraged to complete his/her program in minimum time. It is
recognized that this minimum will vary depending up on the courses taken, the thesis problem, and
the student’s ability. Normally, the student should take the maximum course work load (Graduate
School Regulations) in the early stages of his/ her program and reduced loads in the latter stages.
The graduate programs of all students in the department will be evaluated periodically by the
Graduate Coordinator and the Department Head, with deficiencies and strengths brought to the
attention of those concerned.

THESIS/ SPECIAL PROBLEMS
A thesis is required of those in the M.S. program with thesis option. A problem involving research is
also required of those on assistantship in the Master of Science degree program. Four semester hours
or credits are assigned for the research and writing leading to the M.S. thesis.

Thesis Project Proposal
During the first semester, the student selects his/her major research professor (thesis advisor) and
discusses possible topics with the major research professor. Students are also required to establish a
Thesis Committee (Guidance Committee) consisting of a Chair person and at least two committee
members and request one external committee member. These committee members must be members of the Graduate Faculty. Complete Form (Thesis/Dissertation Committee Appointments), obtain required signatures on appropriate form, and submit to the Department Head and the School Dean for recommendation and finally approval by the Dean of the Graduate School.

Students, after deciding a tentative thesis topic must begin work on developing the research project proposal in consultation with major professor. Although the research is the student’s responsibility, he/she should expect guidance from his or her advisor in selecting a topic. Minimum items that must be included on this are: Tentative Thesis/Project Title, Purpose and Objective(s), Significance of the Problem, Method(s) of Investigation, Expected Results, and Anticipated Date for Completing the Investigation. A suggested format for proposed thesis research proposal/ Special problem is provided in Appendix C. During the second semester (or summer if the student began in spring), the student is expected to finalize the project proposal and present it in a seminar to the faculty and other graduate students. After the seminar, needed revisions are made and signatures obtained from the committee members and the Department head on the form- Report on Thesis/Dissertation Proposal Presentation. Committee chair submits the form indicating proposal has been approved by the thesis committee.

Formulation of objectives and procedures and the writing of a formal project proposal are a required part of the training of graduate students. Master’s degree students with thesis option must register in the course AGSC 5120 (Thesis Writing). This course orients the student toward the research process, including the drafting of his/her thesis/special project research proposal. Thus, each student makes a contribution to the department by planning the research project. Once the project is approved, the student is expected to devote an increasing amount of time to the research. In the later phase of the program (after course work is completed), 100 percent of the student’s time is devoted to research.

All students must indicate in their research proposal whether or not their research will involve human subjects, animal care, radiation safety, hazardous materials. If any of these are involved, obtain Research compliance approval from the Institutional Review Board- (IRB) or Animal Care Committee by submitting a prescribed form and survey, according to procedures on Office of Sponsored Research (TSU) website, before initiating data collection.

Students who have not developed a suitable thesis research proposal (as determined by the thesis committee and Head of Department) and/or done well in presenting the proposal will not be allowed to continue in their program until this deficiency has been corrected. Assistantship may be terminated for those students not meeting the above deadlines.
**Project Time-Line**

Students are expected to complete a time-line with their major advisor that will be used to determine satisfactory progress. Minimum items that should be included on this time-line are the date of the project proposal presentation, submission of a first draft of the thesis to the advisor, and submission of the completed draft of thesis to all committee members **at least two full weeks before the final oral examination**. In addition, students should discuss with the advisor how much time major advisor may need to correct the first draft of thesis and adhere to the time table agreed upon by the major advisor. The time-line should be submitted to the major advisor and graduate coordinator for approval before it is turned in with the project proposal.

**Submission of Thesis / Special Problems**

The major professor has the authority to require the student to have the manuscript (research proposals/ thesis /non-thesis option special problem manuscript) in acceptable form and language before the manuscript is distributed to the student’s committee. Format of the thesis manuscript should conform to the recommendations set forth in the guidelines for preparing Dissertations, Thesis, Projects, and Course Papers available at no cost in the Graduate School and the Graduate School website. Students are required to obtain copy of same from the Graduate School.

In the event of a conflict between the student and major professor on the acceptance of manuscript, the Graduate Coordinator and the Department Head will assist in resolving the question.

1. When the candidate and the major advisor feel that the thesis/ special problem manuscript is in a form suitable for the final draft, copies shall be circulated to: (1) All members of the candidate’s advisory committee; (2) the Graduate Coordinator. A cover letter from the advisor will designate this copy as the official reader’s copy. The committee members must receive the manuscript sufficiently early so that revisions can be made and returned to the faculty at least ten days before the final defense of the research.

2. Although it is expected that major suggestions of committee members will be incorporated into the manuscript, it is the responsibility of the student and his major advisor to see that the reader’s copy incorporates committee suggestions and is essentially in the form from which duplications will be made for submission to the Graduate School. Proper grammar and consistency of style are essential to the manuscript.

3. The candidate’s advisory committee will decide on the acceptance of the completed thesis/ special problem manuscript with regard to content and style.

4. After the defense of the research, members of the student’s committee, the Graduate Coordinator and the Department Head should be given sufficient, time to examine the final manuscript before
GRADUATE EXAMINATIONS

The Final Oral Examination (Thesis Defense)

Oral examinations are the concluding event of each master’s program. These examinations are conducted by the student’s special committee. Oral examinations for the thesis option program normally concentrate on the student’s thesis. The student is expected to “defend” the thesis. This entails being able to answer questions about how and why certain things were done in the thesis and to be able to interpret the results. Student may also be asked questions to determine if the students have been able to integrate the materials learned in courses so to apply them to issues and problems at hand. The major advisor is responsible for scheduling examination in consultation with other thesis committee members, Graduate Coordinator and Department head. The request to hold the examination should be made at least one week (5 working days) prior to the examination. As part of the examining process, the student shall begin the examination by formally presenting his/ her research to the committee (20-30 minutes). Where possible, visual aids should be employed. Other faculty members and graduate students may be invited for the presentation part of the oral examination only. The major advisor is responsible for pre posting examination results to the Dean of Graduate Studies after obtaining signatures from committee members, department head, and the School Dean on the form -Report of Final Oral Examination (defense) of the Thesis or Dissertation.

Comprehensive Examination:

The Master degree students with non-thesis option must register and pass the course AGSC 5350(Independent Study-Contemporary Issues and Problems) near the end of their course work. In this course students, under the guidance of a professor, will study, research a problem or issue resulting in a substantial piece of writing. Upon completion of the course work, each student choosing the non-thesis option must take a comprehensive written and oral examination administered by the student’s advisory committee and other faculty members representing appropriate subject matter areas of Agribusiness, Plant science, and Animal Science. The student’s major advisor will serve as chairman of the committee conducting examination. Student is responsible for obtaining approval from the Graduate School for the examination dates.

Written portion of the comprehensive examination will be based upon the core requirements for candidate’s area of emphasis. At the oral examination, student will begin by giving a short (20-25 minutes) presentation on their study topic. Oral examination will be conducted in such a way as to
determine if the student has been able to apply (synthesize) knowledge gained in various courses in presenting issues and problems and integrate the materials learned in courses so as to apply them to analyze issues in his/her area of interest. In addition, the student will present and discuss the study he/she conducted for the course AGSC5350. Members of the examining committee will then have time to ask the students questions pertaining to his/her presentation, as well as the program of study. Upon completion of the examination, the student’s major advisor must submit the results to the Head of the Department and the Graduate School.

If a student fails the comprehensive examination, one retake will be allowed. Should the student again fail a third and final comprehensive examination may be taken upon completion of additional course work (minimum of 6 hrs) to be selected by the student’s advisory committee.

**ADMINISTRATION OF GRADUATE ASSISTANTSHIPS AND RESPONSIBILITIES OF GRADUATE Assistants**

Incoming graduate research assistants must discuss with their advisors immediately after registration for classes to ensure understanding of requirements for maintaining their graduate assistantships. Students may also contact Dr. Surendra Singh (Dept. Chair) at 963-5829 or Dr. Samuel Nahashon (Graduate Coordinator) at 963-2575 or Prof. Sammy Comer at 963-5820 regarding graduate assistantships.

The graduate Assistantships are available only to qualified graduate students. The College of Agriculture, Human and Natural Sciences funds these assistantships from the funds received from the U.S Department of Agriculture and other potential sources. Assistantships are awarded on a competitive basis to qualified applicants based on individual qualification and merits. Students not initially provided assistantships may become eligible later during their course work, depending on their performance and availability of the funds. In addition, assistantships are awarded only to the students who are unconditionally admitted into the department’s graduate program. Special permission to offer assistantship to conditionally admitted students may be granted by the Head of the Department.

Assistantships are awarded for a maximum period of two years (twenty-four months) for students seeking a Master’s degree and three years (thirty-six months) for students seeking a Ph.D. degree. However, there is no guarantee that stipend payment will continue for the full period; acceptable performance of the assistantship duties is always required. Each assistantship will be reviewed at the end of each semester by the student’s research supervisor, graduate coordinator, the Department head and graduate advisory committee. Renewal will be based upon availability of funds, acceptable performance of work responsibilities, and academic progress.
The assistantships are provided for assisting the progress of the school’s research/teaching projects and thus, financing students’ research associated with graduate study. The basic assistantship in the department is a one-half time appointment. A graduate research assistantship is generally a part-time formal appointment. A half-time assistantship carries with it the obligation to devote at least 20 hours/week in research duties over the duration of the student’s program.

Students receiving the assistantship accept the responsibility to perform the duties including carrying out supervised research related to his/her graduate program and to his/her other works as assigned by the major advisor and the Department head. Acceptable completion of assigned research tasks rather than simply working a specified number of hours per week constitutes a fulfillment of the assistantship obligations. The total annual cost for in-state tuition and stipend is estimated at about $17,653 for Master’s degree seeking students and $27,000 for Ph.D. degree seeking students. The Department of Agricultural and Environmental Sciences will pay the in-state tuition through the graduate research assistantship and the graduate research assistant will receive a monthly stipend whose amount will be determined by their progress in the degree program as presented in Table 1 below:

Assistantships will be awarded based on accomplishments of the graduate assistant in previous semesters leading to current semester of enrollment. Depending on availability of funds and student performance, assistantships will be renewed for not more than a total two years (24 months) for Masters Students and three years (36 months) for Doctoral students.

| Table 1: Milestones Determining Remuneration for Graduate Research Assistantships |
|----------------------------------------|------------------------------------------|-------------------------------|
| Milestone (MS Program) | Credit hrs. Completed | Remuneration (stipend) |
| Enrollment into the program | First Semester of enrollment (completed 0-9 credit hrs.) | $750.00/month |
| Satisfactorily, completing, defending and thesis research proposal to The School of Graduate Studies and Research. Receive an overall rating of ≥4/5 in semester evaluation** | Second and Third Semester of enrollment (Completed 9 or more credit hours) | $833.00/month |
| Completed a minimum of approved 26 hours of graduate level courses. Received overall rating of ≥4/5 in evaluations. Preparing manuscript for publication. Graduate Research assistant devoting 100% of their time in thesis research** | Fourth semester of enrollment (completion 26 or more credit hours) | $917.00/month |
| Doctoral Students | First semester to 36 months | $1,500.00/month |
Extension of graduate research assistantships may be granted with recommendation of student’s advisor and review by the graduate advisory committee. Continuation of each assistantship is based on a satisfactory performance and maintenance of a minimum overall GPA of 3.00 on a 4:00 scale.

In addition, graduate assistants must be full-time (registered for 9 semester hours or more during the fall and spring semesters and in summer for thesis-4 hours or more) students. All graduate assistants must choose the thesis option for their Master of Science degree in the Department of Agriculture and Environmental Sciences. During the first semester, the student selects his/her major research professor and begin work on the research project proposal. During the second semester (or summer if the student began in spring), the student is expected to finalize the project statement and present it in a seminar to the faculty and other graduate students. Thus, each student contributes to the department by planning the research project. Once the project is approved, the student is expected to devote an increasing amount of time to the research. In the later phase of the program (after course work is completed), 100 percent of the student’s time is devoted to research.

Each graduate assistant has a responsibility to the department to carry out assigned research work under the direction of his or her major professor and to complete such research. Work responsibilities during initial semesters will contribute to the student’s understanding of the research that ultimately will be undertaken in the thesis and in all cases will contribute to the student’s research skills. A student is encouraged to submit contributed papers to professional associations to publish the results of research prior to and after completion of the thesis.

The primary responsibility of each Graduate research assistant is the completion of research projects that have been assigned. However, the student may be expected to undertake other tasks as assigned by his or her major professor, or the department head.

Note: Graduate Research Assistants must stay on campus and pursue their research uninterrupted. On a case by case basis, if a student must take an internship during their course of study, and if the internship is directly related to their research, these students can continue to receive graduate research assistantship when they return to the University after the internship. If a student decides to break their research training to take internships (Summer or otherwise) that is(are) not related with their research will forfeit their assistantship and will also not be eligible for work aid.
Minimum qualifications and guidelines for the Award of Graduate Assistantship (Master’s and Ph.D. degree) in the Department of Agriculture and Environmental Sciences:

1. Must be admitted to the Master of Science degree in Agricultural Sciences program or the Ph.D. degree program in Biological Sciences at Tennessee State University;
2. Must submit a statement (750-1,000 words) why you should be awarded assistantship and how it is going to help you in your professional development;
3. A minimum GPA of 2.75 on a 4.00 point scale or better at the undergraduate level (for MS students only) and 3.0 on a 4.0 point scale or better at the Masters level, and a minimum score of 290 on the GRE, or 385 on the MAT (only GRE scores are accepted for Ph.D. students); and
4. Interview in person or by phone with department head and/or Graduate Coordinator and possible thesis advisor(s);

Application forms for Graduate Research Assistantships are available from the Department of Agriculture and Environmental Sciences, College of Agriculture, Human and Natural Sciences, Tennessee State University, and Nashville, TN 37209-1561. Assistantship applications should be submitted as early as possible, as but no later than July 1 for the fall semester, November 1 for spring and April 1 for summer sessions.

Graduate Assistantship applications are made directly to the department, not to the Graduate School. The Graduate Admission Committee, which is appointed by the Head, Department of Agriculture and Environmental Sciences, will review applications for Graduate Research Assistantships and makes recommendations to the department head on granting of assistantship.

Job Description for Graduate Research Assistants Pursuing M.S. and Ph.D. Degrees

Graduate Research Assistant Pursuing M.S. Degree

The appointment is associated with research and requires the following responsibilities:

1. To carry out a designed program of research under the supervision of a designated supervisor/major professor;
2. To be able to work on and contribute to collaborative research teams; and
3. To complete a thesis proposal with appropriate supervisory assistance;
4. To perform the following major duties that include but are not limited to:
   - Reading and comprehending reports and other scientific literature;
   - Conducting data analysis and computations;
   - Harvesting of field and/or laboratory samples;
   - Writing research reports and preparing manuscripts for publication in refereed journals and presenting data at conferences, scientific symposium and professional society meetings;
Attending departmental seminars (required);
To take oral examination following completion of course work and in consultation with the Graduate School; and
Other duties as assigned by the major professor

**Graduate Research Assistant Pursuing Ph.D. Degrees**
A graduate research assistantship is generally a part-time formal appointment. It requires completion of specific duties commensurate with the percentage appointment (e.g., 20 hours/week for a 50% [half-time] appointment). The appointment is associated with research and requires the following responsibilities:

1. To undertake research in at least one programmatic area within the department of admission;
2. To be able to work on and contribute to collaborative research items;
3. To complete a dissertation proposal with appropriate supervisory assistance; and
4. To perform the following major duties that include but are not limited to:
   - Reading and comprehending reports and other scientific literature;
   - Conducting data analysis and computations;
   - Harvesting of field and/or laboratory samples;
   - Providing data files and hard copy reports and materials to the major professor in a timely manner;
   - Participating in a meaningful teaching experience for at least one semester as determined by major professor;
   - Presenting a seminar on the dissertation results;
   - Writing research reports and manuscripts for publication in refereed journals;
   - Presenting data at conferences, scientific symposium and professional society meetings;
   - Attending departmental seminars (required);
   - To take oral examination following completion of course work and in consultation with the Graduate School; and
   - Other duties as assigned by the major professor.

**Evaluation of Graduate Research Assistants:**
Each graduate research assistant’s progress will be reviewed at the end of each semester. This process reviews progress on research (see section on the project proposal) as well as academic performance and is an integral part of maintaining an effective graduate program.

Students are expected to schedule a minimum of 9 (nine) semester hours each semester until their course load is completed. The review is conducted for the purpose of allocating assistantship funds.
or continuation of assistantships. Failure by the student to pass, in any one semester, nine hours of coursework on the graduate program with 3.0 or better grade point average will be sufficient grounds for reduction in the rate of stipend or suspension of the assistantship. Unsatisfactory performance includes failure to maintain a “B” average in all courses attempted for graduate credit. Any student not meeting the requirements for admission for candidacy is likewise not eligible to continue in the program.

Students not meeting the academic standards of the department will be subject to dismissal. The Graduate Evaluation Committee, appointed by the Head, Department will recommend the dismissal of any student who: (1) earns less than 2.75 quality point average in a semester (on all hours attempted) or (2) earns less than a 3.00 quality point average in two consecutive semesters. Appeals of dismissals may be made to a committee composed of the Department Head, the Graduate Coordinator, the student’s Graduate Advisor, and the Graduate Evaluation committee. The decision of this committee will be final.

**Time Limits on Assistantships**

Students on assistantships must complete their Master’s degree program within the time period of two years (24 months). If duties or other matters require his or her absence from the office during regular working hours, the graduate assistant is expected to notify the major advisor and the secretary assigned to the Graduate Coordinator of such absence, the nature of absence, and how he or she can be reached in case such should be necessary. Failure to receive prior approval for absences may result in termination of the assistantship. Although graduate research assistants do not earn leave with pay, they are considered junior staff members and are required to observe the research station work schedule.

**WORK AID**

- Graduate students who qualify to be on graduate research assistantship will not be considered for Work Aid;
- Work aid will be provided to needy and qualified graduate students on a case by case basis and under special consideration by the student’s advisor and the departmental graduate committee; and
- Remuneration will be consistent with policy guidelines for work aid and is limited to twenty hours per week.
ASSIGNMENT OF OFFICE SPACE
The Graduate Coordinator, in consultation with the Department Head, will be responsible for assignment of office space to graduate students. Doctoral candidates will receive priority in the assignment of offices. Those with seniority in the graduate program will receive priority in assigning space for Masters Candidates. Students interested in moving from their presently assigned space to a vacancy should contact the Department Head. Furniture is not assigned to the graduate student, but to the office in which it is located.

Requesting More Information
More details, if needed, may be obtained by writing to the Department of Agricultural and Environmental Sciences or by calling (615)963-5431

COMMITMENT TO EXCELLENCE THROUGH DIVERSITY
The College of Agriculture, Human and Natural Sciences actively shares the University’s commitment to excellence through diversity. We are dedicated to increase the ethnic and cultural diversity of our student and faculty community and to activities and actions that will lead to a more just and humane society. We strongly encourage applications from students with nontraditional backgrounds who have high potential and aptitude. We will strive to find the financial resources needed to attract and retain students who will enable us to better demonstrate our commitment to diversity.
FORMAT FOR PROPOSED THESIS RESEARCH/SPECIAL PROBLEM

Department of Agriculture and Environmental Sciences

1. Student name: ____________________________________________

2. Time schedule: (a) Initiation date: ____________________________
   (b) Expected complete date: ________________________________

3. Title: __________________________________________________

4. Nature of the problem (problem description): ________________

5. State of current knowledge regarding this problem: ____________

6. Objectives of the proposed study: ____________________________

7. Methods and procedures to be followed (including sources of data, and discussion
   and justification of analytical procedures to be used): ______________

8. Potential use of results (how this piece of research fits into the broader area of
   knowledge): ____________________________

9. Date presented to Advisory Committee: ______________________

10. Date presented seminar: ________________________________

11. Approval: ________________________________________

__________________________________  _______________________
Major Advisor                                      Member of Committee

__________________________________  _______________________
Member of Committee                       Graduate Program Coordinator

__________________________________  _______________________
Member of Committee                          Head, Department of Agriculture and
                                               Environmental Sciences

__________________________________
Date of Final Approval
OFFICE OF GRADUATE STUDIES & RESEARCH

Change of Program or Personnel

Name: ___________________________ Date: _______________ ID #: ___________________________

Address: ___________________________ City/State/Zip: ___________________________ Term: ___________________________

Directions: Enter in the space below any changes in the approved program or personnel including change of non-degree status, change of major, change in required courses, and change of guidance committee personnel. NOTE: When this petition is used to request a change of major, the petition must be approved by the student’s current advisor and Head of the department in which the prospective major is located. Then application materials will be sent to the new department for review.

I. CHANGE NON-DEGREE STATUS

Non-degree request to degree must be accompanied by acceptable test scores

<table>
<thead>
<tr>
<th>Test</th>
<th>Date Taken</th>
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II. CHANGE MAJOR

PLEASE CHANGE MY MAJOR FROM:

Degree Seeking: MA MAED MBA MCJ ME MED MPA
MS MSN EDS EDD EDD PHD

PLEASE CHANGE MY MAJOR TO:

Degree Seeking: MA MAED MBA MCJ ME MED MPA
MS MSN EDS EDD EDD PHD

III. CHANGE COURSES

ADD: COURSE ID DESCRIPTION COURSE ID DESCRIPTION

DELETE: COURSE ID DESCRIPTION COURSE ID DESCRIPTION

IV. CHANGE ADVISEMENT/COMMITTEE PERSONNEL

PLEASE CHANGE MY MAJOR ADVISOR FROM

PLEASE CHANGE MY MAJOR ADVISOR TO

PLEASE CHANGE MY CHAIR PERSON FROM

PLEASE CHANGE MY CHAIR PERSON TO

PLEASE CHANGE MY COMMITTEE PERSON FROM

PLEASE CHANGE MY COMMITTEE PERSON TO

Student’s Signature _______________ Date _______________

Recommended by: ___________________________ Approved by: ___________________________

Advisor ___________________________ Date _______________ Dean of Graduate School ___________________________ Date _______________

Dept. Head ___________________________ Date _______________ Dean of College/School ___________________________ Date _______________
OFFICE OF GRADUATE STUDIES & RESEARCH
Transfer of Credit Form

Name: ___________________________ Date: ___________________________
Address: ___________________________ ID #: ___________________________
City/State/Zip ___________________________ Degree: ___________________________
Major ___________________________ Concentration: ___________________________

Official transcripts for credit must be attached or on file with the Office of Graduate Studies & Research before transfer credit can be approved. Credit taken after admission to TSU should be approved by the student’s advisor prior to enrollment.

************************************************************************************************************
At the master’s level, a student may transfer a maximum of twelve (12) semester hours or eighteen (18) quarter hours of graduate credit. At the specialist’s and doctoral level, a maximum of six (6) semester hours may be transferred. Only courses in which the student earned grades "B" or better, and which are taken within the degree program time limit, will be considered for transfer.

(See Graduate Catalog for further details)

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Student’s Signature ___________________________________________ Date ________________

Recommended by: ___________________________________________ Approved by: ___________________________
Advisor ___________________________________________ Date ________________

Dean of Graduate School ___________________________________________ Date ________________

Dept. Head ___________________________________________ Date ________________
Dean of College/School ___________________________________________ Date ________________
OFFICE OF GRADUATE STUDIES & RESEARCH

Program of Study and Advancement to Candidacy

For Master's or Specialist Degree Programs

1. Complete the Admission to Candidacy/Program of Study form in consultation with your advisor;
2. To be completed when student has completed between 9 to 15 semester hours;
3. Seek unconditional admission into your degree program of choice, clearing any and all conditions for admission (i.e., test scores, prerequisites courses, etc);
4. Remove any Incomplete ("I") grades from the permanent record;
5. Type or print information on form, and submit to advisor for signatures.
6. Return three (3) copies of the form to the Graduate School.

### Required Courses

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Course Title</th>
<th>Semester Hrs.</th>
<th>Grade</th>
<th>Semester Completed</th>
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</table>

### Concentration

<table>
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<th>Course ID</th>
<th>Course Title</th>
<th>Semester Hrs.</th>
<th>Grade</th>
<th>Semester Completed</th>
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</thead>
</table>

### Electives

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<tr>
<th>Semester Hrs.</th>
<th>Semester</th>
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</thead>
</table>

Total Number of hours required for degree:

Note: Transfer credit must be approved before it can be shown on the program of study - use Transfer of Credit Form.

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Student’s Signature ___________________________ Date

Recommended by: ___________________________ Date

Advisor ___________________________ Date

Dept. Head ___________________________ Date

Prereq. Courses Required

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Sem. Hrs.</th>
<th>Sem. Comp</th>
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### Courses Taken in Non-Degree Status (9)

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<th>Sem. Comp</th>
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</table>

Test Scores

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<th>MAT:</th>
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<th>FE:</th>
</tr>
</thead>
</table>

Total Number of hours required for degree:

Note: Transfer credit must be approved before it can be shown on the program of study - use Transfer of Credit Form.

Dean of College/School ___________________________ Date

Approved by: ___________________________ Date

Dean of Graduate School ___________________________ Date
### Thesis/Dissertation Committee Appointments

**MUST SUBMIT FORM TYPED**

Name: ________________________________ Date: ________________________________

Address: ________________________________ ID #: ________________________________

City/State: ________________________________ Zip: ________________________________

Catalog Yr: ________________________________ Degree: ________________________________

Major: ________________________________ Concentration: ________________________________

**Topic/Title:** ________________________________

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### V. EXTERNAL MEMBER REQUEST (TSU Graduate Faculty Member outside of major department)

<table>
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<th>Position/Dept.</th>
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<th>Date</th>
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<tbody>
<tr>
<td>Degrees Held</td>
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Statement of rationale for appointment:

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### VI. COMMITTEE APPOINTMENTS

<table>
<thead>
<tr>
<th>Committee Chair</th>
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<td>Committee Member</td>
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**Recommended by:**

**Approved by:**

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OFFICE OF GRADUATE STUDIES & RESEARCH

Change of Program or Personnel

Name: ___________________________ Date: ___________________________
Address: ___________________________ ID #: ___________________________
City/State/Zip: ___________________________ Term: ___________________________

Directions: Enter in the space below any changes in the approved program or personnel including change of non-degree status, change of major, change in required courses, and change of guidance committee personnel. NOTE: When this petition is used to request a change of major, the petition must be approved by the student’s current advisor and Head of the department in which the prospective major is located. Then application materials will be sent to the new department for review.

VII. CHANGE NON-DEGREE STATUS
Non-degree request to degree must be accompanied by acceptable test scores

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Miller Analogies Test (MAT): Date Taken ____________ Score ___________________________
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VIII. CHANGE MAJOR
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IX. CHANGE COURSES
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X. CHANGE ADVISEMENT/COMMITTEE PERSONNEL

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PLEASE CHANGE MY COMMITTEE PERSON FROM

PLEASE CHANGE MY COMMITTEE PERSON TO

Student’s Signature: ___________________________ Date: ___________________________

Recommended by: ___________________________ Date: ___________________________

Approved by: ___________________________ Date: ___________________________

Advisor: ___________________________ Date: ___________________________

Dept. Head: ___________________________ Date: ___________________________

Dean of College/School: ___________________________ Date: ___________________________
OFFICE OF GRADUATE STUDIES & RESEARCH
Transfer of Credit Form

Name: ____________________________ Date: ____________________________
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Major: ____________________________ Concentration: ____________________________

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Student’s Signature ____________________________ Date ____________________________

Recommended by: ____________________________ Date ____________________________

Approved by: ____________________________ Date ____________________________

Advisor ____________________________ Date ____________________________

Dean of Graduate School ____________________________ Date ____________________________

Dept. Head ____________________________ Date ____________________________

Dean of College/School ____________________________ Date ____________________________
OFFICE OF GRADUATE STUDIES & RESEARCH
Program of Study and Advancement to Candidacy
For Master's or Specialist Degree Programs

Name: ___________________________ Date: ___________________________
Address: ___________________________ ID #: ___________________________
City/State: ___________________________ Zip: ___________________________
Catalog Year: ___________________________ Degree: ___________________________
Concentration: ___________________________

7. Complete the Admission to Candidacy/Program of Study form in consultation with your advisor;
8. To be completed when student has completed between 9 to 15 semester hours;
9. Seek unconditional admission into your degree program of choice, clearing any and all conditions for admission (i.e., test scores, prerequisites courses, etc);
10. Remove any Incomplete ("I") grades from the permanent record;
11. Type or print information on form, and submit to advisor for signatures.
12. Return three (3) copies of the form to the Graduate School.

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<th>XI.</th>
<th>Semester</th>
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Total Number of hours required for degree: ___________________________

Note: Transfer credit must be approved before it can be shown on the program of study - use Transfer of Credit Form.

Student’s Signature ___________________________ Date: ___________________________

Recommended by: ___________________________ Date: ___________________________

Advisor ___________________________ Date: ___________________________

Dept. Head ___________________________ Date: ___________________________

Approved by: ___________________________ Date: ___________________________

Dean of College/School ___________________________ Date: ___________________________

Dean of Graduate School ___________________________ Date: ___________________________
### XVII. EXTERNAL MEMBER REQUEST (TSU Graduate Faculty Member outside of major department)

External Member | Position/Dept. | Signature | Date
--- | --- | --- | ---

Degrees Held  

Statement of rationale for appointment:  

---

Recommended by:  

Approved by:  

---

Department Head | Date
--- | ---

Dean of College/School or Director of Institute | Date

Dean of Graduate School | Date
OFFICE OF GRADUATE STUDIES & RESEARCH


Check one:  ☐ Thesis  ☐ Dissertation

To the Dean of the Graduate School:

Student's Name ____________________________________________  ID# ______________

Has submitted in partial fulfillment of the requirements for the degree of ___________ in
the College/School/Institute of ____________________________ a proposal titled: _____________
_________________________________________________________________________________
_________________________________________________________________________________

This proposal has been examined by all members of the candidate's supervisory committee and
has been:

_____ Approved   _____Approved with Conditions   ____ Not Approved

Additional Comments:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Note: If proposed research uses Human Subjects, written approval from the TSU Office of
Sponsored Research must be obtained prior to initiating data collection.

Committee Signatures:

Chair                     Date

Committee Member         Date

Committee Member         Date

Committee Member         Date

External Member          Date

Recommended by:  Approved by:

Dept. Head               Date                  Dean of Graduate School  Date

Dean of College/School   Date

Note: A copy of the proposal must be attached.
Examinee # _____  OFFICE OF GRADUATE STUDIES & RESEARCH
Comprehensive Examination Application
For Master or Specialist Degree Programs

*******************************************************************************************
Note: This form should be filed with the Office of Graduate Studies & Research in the same semester the
student files application to graduate. Check with major advisor for filing deadlines.

REQUEST TO TAKE COMPREHENSIVE EXAM – *Please Print*

Name: ___________________________ Date: ___________________________
Address: ___________________________ ID #: ___________________________
City/State: ___________________________ Zip: ___________________________
Catalog: ___________________________ Degree: ___________________________
Major: ___________________________ Concentration: ___________________________
Date of Examination: ___________________________ Intended Graduation Date:
Phone #: ___________________________

Student’s Signature ___________________________ Date ___________________________

Email address required (Please print clearly)

Recommended by: ___________________________

Approved by: ___________________________

Advisor: ___________________________ Date: ___________________________
Dept. Head: ___________________________ Date: ___________________________
Dean of College/School: ___________________________ Date: ___________________________

*******************************************************************************************
EXAMINATION RESULTS
HIGH PASS _______ PASS _________ FAIL _________ NO SHOW _________

*******************************************************************************************
RECOMMENDATION
Student permitted to retake exam  
Next Exam Date: ___________________________
Student dismissed from program 

Department Head Signature ___________________________ Date: ___________________________
Electronic Theses and Dissertations Checklist
School of Graduate Studies and Research
Tennessee State University

This checklist is used to simplify the review of your document by the Graduate School. This form must be signed by the graduate student and Chair of the Thesis/Dissertation Committee and submitted to the School of Graduate Studies & Research. All items must be checked to ensure that all requirements are met.

PRELIMINARY STEPS:
_____ Enrolled in Thesis/Dissertation credits this semester.
_____ Read & followed the “Guidelines for the Preparation of Dissertations, Theses, Projects, and Course Papers”.
_____ Style manual followed: APA, Turabian, ADA, ASA, other? (__________________).
_____ Theses/Dissertations consistently followed one of these style manuals.

ORGANIZATION:
___ Title Page with Research Series
___ Plain Title Page
___ Copyright Page

Signature Pages
_____ One hard copy Signature Page signed by thesis/dissertation committee members- hand signed (deposit this copy at the Graduate School).
_____ One electronic copy listing names of thesis/dissertation committee members (include this copy in your manuscript to be submitted electronically). See a sample below.
___ Dedication Page (Optional)
___ Acknowledgments (Optional)
___ Abstract (not to exceed 350 words)
___ Preface (optional)
___ Table of Contents 
___ List of Table (if five or more)
___ List of Figures, Charts, etc. (if five or more)
___ List of symbols (optional)
___ Text, divided into chapters designated by Roman numerals
___ References, must conform to style manual approved by the student’s department
___ Appendices, must conform to the style manual approved the student’s department
___ Research Compliance Approval Letter (if using human subjects, animal subjects, etc)

TYPE SIZE:
_____ Standard 10 or 12 pitch
_____ Top margins of first pages of text and all first pages of chapters two inches, all other pages one and one-half at the top
MARGINS:
___ Left margin one and one-half inches on all pages
___ Right margin one inch throughout
___ Bottom margin one inch throughout

SPACING:
___ Text must be double spaced, first line of each paragraph indented

PAGINATION
___ Every Page should be assigned a number (some may not be shown)
___ Small Roman numerals for preliminary pages, Arabic numbers for pages of text
___ Page number should be positioned in the same place (upper right corner of the margin line at the right, and one inch from the top of the sheet)

TABLES/FIGURES
___ Tables/figures may follow page on which they are first referenced, or they may be included in a separate appendix
___ Tables/figures must be identified in the text by a number

MISCELLANEOUS
___ No widows or orphans.
___ All page numbers in the Table of Contents should correspond with page numbers in the text.
___ All refer

ELECTRONIC SUBMISSION
___ Made necessary changes to document after defense.
___ Included Typed Committee Signature Page as page ii (second) of your manuscript.
___ Converted dissertation to a PDF file
___ Uploaded dissertation via TSU Graduate School ETD System
http://dissertations.umi.com/tnstate/

ITEMS TO DEPOSIT AT THE GRADUATE SCHOOL (After Electronic Submission)
___ Completed Survey of Earned Doctorates
___ Signed Signature Page
___ Thesis/Dissertation Checklist

I have checked the manuscript for all of the above items.
Student’s name (please print): ______________________________
Signature: _______________________________ Date: ______________
E-mail Address: ____________________

I have checked the manuscript for all of the above items.
Thesis/Dissertation Chair’s Name (please print): ______________________________
Signature: _______________________________ Date: ____________________
APPENDIX B
Biosafety Manual for Tennessee State University

The manual is also available at:

Important Telephone Numbers

Emergency Telephone Numbers:
Campus Police: 963-5171
Fire, Police, Rescue 9-1-1
Biosafety Committee Chair: Dr. Mohammad Karim- 963-5344
Radiation Safety Officer: 963-5344
University Health center: 963-5291
Facilities Management: 963-4898

Useful Websites:

NIH Office of Biotechnology Activities: http://www4.od.nih.gov/oba/
CDC Select Agents Program: http://www.cdc.gov/od/sap/index.htm
USDA/APHIS Select Agents Program:
CDC Permit to Import or Transport Etiologic Agents: http://www.cdc.gov/od/eaipp/
USDA/APHIS Permit to Import or Transport Livestock Pathogens:
USDA/APHIS Permit to Field Test, Import, or Transport Genetically Modified Organisms:
University of Maryland Form for Registration of Biological Materials:
http://des.umd.edu/research/login.cfm
Selection, Installation, and Use of Biological Safety Cabinets:
http://www.cdc.gov/od/ohs/biosfty/bsc/bsc.htm
Policy Statement

I. Purpose:

The purpose of the manual is to establish the process for compliance with the following documents:

A. NIH Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines):

B. Biosafety in Microbiological and Biomedical Laboratories (BMBL)

II. Policy:

Tennessee State University is committed to preserving the health and safety of its students, faculty and staff. The University is also committed to protecting the environment and the community. It is recognized that the use of recombinant DNA or other potentially harmful pathogenic microorganisms is necessary in many research and teaching laboratories at the University. The University requires the compliance with the NIH guidelines and with the recommendations in BMBL to ensure the safe handling of these organisms. Compliance with other applicable Federal, State, and Local regulations is also required.

III. Responsibilities:

The Principal Investigator (PI) is directly and primarily responsible for the safe operation of the laboratory. His/her knowledge and judgment are critical in assessing risks and appropriately applying the recommendations in this manual. However, safety is a shared responsibility among all of the laboratory staff. Institutional Biosafety Committee (IBC) is to assist the PI with these responsibilities.

A. The University Biosafety Committee shall:

1. Prepare the Biosafety Manual, with revisions as necessary;
2. Distribute the Manual to each faculty member who works with biological materials;
3. Investigate accidents involving infectious agents;
4. Provide or coordinate biosafety training as requested
5. Assist investigators with risk assessment
6. Administer all elements of the Biosafety Program, assist faculty with submission of registrations to the IBC, and maintain registration files
7. Review rDNA research conducted at or sponsored by the University for Compliance with the *NIH Guidelines*, and approves those research projects that are found to conform with the *NIH Guidelines*

8. Review research involving infectious agents conducted at or sponsored by the University for Compliance with the guidelines in *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, and approves those research projects that are found to conform with the recommendations in *BMBL*;

9. Notify the PI of the results of the IBC's review and approval;

10. Report any significant problems with or violations of the *NIH Guidelines* and any significant research-related accidents or illness to the appropriate Institutional official and to the NIH Office of Biotechnology Activities (OBA) within 30 days; and

11. Follow the guidelines for membership defined by NIH, with the additional requirement of one representative from the University of Maryland Animal Care and Use Committee, and a plant pathologist from USDA as appropriate.

**B. PIs shall:**

1. Assess the risks of their experiments;

2. Ensure the safe operation of their laboratory;

3. Train laboratory personnel in safe work practices;

4. Comply with all applicable state and federal regulations and guidelines;

5. Register the following experiments with the IBC, as required:
   a. recombinant DNA activities;
   b. work with infectious agents;
   c. experiments involving the use of human blood or other potentially infectious materials, such as unfixed human tissues, primary human cell lines, and certain body fluids; and
   d. animal and plant pathogens.

**C. The University Health Center (UHC) shall:**

1. Provide medical surveillance, as required by the OSHA Bloodborne Pathogens Standard (CFR 1910.1030), and as recommended in the *BMBL* and *NIH Guidelines*; and

2. Provide vaccinations, as required.
D. Laboratory personnel shall:

1. Comply with safety recommendations for the work being performed; and
2. Report accidents or injuries to the PI.

**Classification of Potentially Infectious Agents**

Procedures and facilities involved in protecting laboratory workers, the public, and the environment from laboratory biological hazards are governed by federal and state regulations and guidelines. Many granting agencies require that grant recipients certify that they adhere to both the guidelines and the regulations.

**Microorganisms**

The National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC) publish guidelines for work with infectious microorganisms. The publication, entitled *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, recommends that work be done using one of four levels of containment: Biosafety Level 1 (BSL1), BSL2, BSL3 and BSL4 (see next chapter). The *NIH Guidelines* (Appendix B) classify pathogenic agents into one of four risk groups according to specific criteria. It is Tennessee State University policy that all laboratories adhere to these NIH/CDC guidelines.

**Microorganisms capable of causing infection in humans**

Investigators must register any project involving a pathogenic agent with the IBC and receive its approval before work is begun. Following receipt of the completed Registration Document by IBC, the laboratory will be surveyed by the Institutional Biosafety Committee (IBC) to ascertain that it meets the containment requirements listed in *BMBL* for the agent being studied. If the lab meets the requirements, the work will be reviewed and approved or disapproved by the IBC.

**Genetically Engineered Microorganisms**

Work with all genetically engineered organisms must comply with the *NIH Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines-Recent Report April 2002)*. These guidelines classify recombinant DNA experiments into four levels of containment (BSL1, BSL2, BSL3, and BSL4) based on the hazard of the microorganism and the procedures and quantities being used. Additionally, the United States Department of Agriculture (USDA)
requires permits for field testing of genetically engineered plants. It is Tennessee State University policy that all laboratories follow these guidelines.

**Registration** Each PI is responsible for registering all recombinant DNA experiments with the IBC, including those exempt from the *NIH Guidelines*. The IBC audits all laboratories where BSL2 or BSL3 containment is required. BSL1 laboratories are audited on request of the PI.

**Review and Approval of Experiments**
The IBC, which oversees recombinant DNA research at Tennessee State University, will review the registration.

a. **Experiments covered by the *NIH Guidelines*** Many experiments involving rDNA molecules require registration and approval by the IBC before work may be initiated. Experiments that require IBC approval before initiation include those that involve:

- Risk Group 2, 3, 4, or research involving Select Agents.
- Cloning DNA from Risk Group 2, 3, 4, or Select Agents.
- Infectious virus or defective virus in the presence of helper virus in tissue culture systems.
- Whole plants or animals.
- More than 10 liters of culture.

Experiments that must be registered at the time of initiation include those that involve:

- the formation of recombinant DNA molecules containing no more than 2/3 of the genome of any eukaryotic virus propagated in tissue culture.
- recombinant DNA-modified whole plants, and/or recombinant DNA-modified organisms associated with whole plants, except those that fall under Section III-A, III-B, III-C, or III-E of the Guidelines.
- the generation of transgenic rodents that require BSL1 containment.

b. **Experiments exempt from the *NIH Guidelines***
Experiments exempt from the *NIH Guidelines*, although requiring registration with the IBC, may be initiated immediately. The Chair of the IBC or the BSO will review the registration and confirm that the work is classified correctly according to the *NIH Guidelines*. Exempt experiments are those that:
o use rDNA molecules that are not in organisms or viruses.

o consist entirely of DNA segments from a single nonchomosomal or viral DNA source, though one or more of the segments may be a synthetic equivalent.

o consist entirely of DNA from a prokaryotic host including its indigenous plasmids or viruses when propagated only in that host (or a closely related strain of the same species), or when transferred to another host by well established physiological means.

o consist entirely of DNA from an eukaryotic host including its chloroplasts, mitochondria, or plasmids (but excluding viruses) when propagated only in that host (or a closely related strain of the same species).

o consist entirely of DNA segments from different species that exchange DNA by known physiological processes, though one or more of the segments may be a synthetic equivalent.

o do not present a significant risk to health or the environment as determined by the NIH Director.

o contain less than one-half of any eukaryotic viral genome propagated in cell culture.

o use *E. coli* K12, *Saccharomyces cerevisiae*, or *Bacillus subtilis* host - vector systems, unless genes from Risk Group 3 or 4 pathogens or restricted animal pathogens are cloned into these hosts.

o involve the purchase or transfer of transgenic rodents for experiments that require BSL1 containment.

**Human Blood, Unfixed Tissue, and Cell Culture**

Please refer to the *Bloodborne Pathogens Exposure Control Plan Appendix 6* for detailed information on handling human clinical material. Work with human material is regulated by the Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard, 29 CFR, Part 1910.1030. Human blood, unfixed tissue, cell culture, and certain other body fluids are considered potentially infectious for bloodborne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). All human clinical material should be presumed infectious and handled using BSL2 work practices. This concept is called Universal Precautions. Investigators are responsible for notifying IBC of their use of human materials. Training and immunization are required by OSHA.

**Plant and Animal Pathogens**
The IBC requires investigators to register their campus use of plant pathogens. The registration form for animal pathogens is available at the web site: http://www.tnstate.edu. Registration of plant pathogens may be completed by forwarding a copy to the Biosafety Office.

Select Agents
Select Agents are microorganisms and toxins that have potential for use by terrorists. The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 restricts their possession and use, and requires the University to collect and maintain information on the location and use on campus of any select agents or toxins. Please contact the Biosafety Office immediately if you currently possess or plan to acquire any of the listed agents and have not yet reported that fact. Failure to provide notice may result in civil and criminal liability for individual researchers and/or the University. If you have questions, you may contact the Biosafety Office, or visit CDC's Select Agent Program web site, which provides links to select agent program information.

Biosafety Containment Levels
Four levels of Biosafety are defined in the publication *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, published by the CDC and NIH. The levels, designated in ascending order by degree of protection provided to personnel, the environment, and the community, are combinations of laboratory practices, safety equipment, and laboratory facilities (see Appendices). Most microbiological work Tennessee State University is conducted at BSL1 or BSL2 containment. There are no BSL4 laboratories at the university.

Biosafety Level 1
BSL1 is appropriate for undergraduate and secondary educational training and teaching laboratories, and for other facilities in which work is done with well-characterized agents not known to cause disease in healthy adult humans. The laboratory is not necessarily separated from the general traffic patterns in the building. BSL1 represents a basic level of containment that relies on standard microbiological practices with no special primary or secondary barriers recommended, other than a sink for hand washing. The following Standard Microbiological Practices apply to all Biosafety Levels. Additional practices recommended for BSL2 are in Appendix 2, and for BSL3 in Appendix 3.
Standard Microbiological Practices:

1. Access to the laboratory is limited or restricted at the discretion of the laboratory director when experiments or work with cultures and specimens are in progress.

2. Persons wash their hands after they handle viable materials and animals, after removing gloves, and before leaving the laboratory.

3. Eating, drinking, smoking, handling contact lenses, and applying cosmetics are not permitted in the work areas where there is reasonable likelihood of exposure to potentially infectious materials. Persons who wear contact lenses in laboratories should also wear goggles or a face shield. Food is stored outside the work area in cabinets or refrigerators designated and used for this purpose only.

4. Mouth pipetting is prohibited; mechanical pipetting devices are used.

5. All procedures are performed carefully to minimize the creation of splashes or aerosols.

6. Work surfaces are decontaminated at least once a day and after any spill of viable material.

7. All cultures, stocks, and other regulated wastes are decontaminated before disposal by an approved decontamination method, such as autoclaving. Materials to be decontaminated outside of the immediate laboratory are to be placed in a durable, leak-proof container and closed for transport from the laboratory. Materials to be decontaminated off-site are packaged in accordance with applicable state and federal regulations before removal from the facility.

8. An insect and rodent control program is in effect.

Biosafety Level 2

BSL2 is similar to Level 1 and is suitable for work involving agents of moderate potential hazard to personnel and the environment. It differs in that (1) laboratory personnel have specific training in handling pathogenic agents and are directed by competent scientists, (2) access to the laboratory is limited when work is being conducted, (3) extreme precautions are taken with contaminated sharp items, and (4) certain procedures in which infectious aerosols or splashes
may be created are conducted in biological safety cabinets or other physical containment equipment. With good microbiological techniques, work at BSL2 can be conducted safely on the open bench, provided the potential for producing splashes or aerosols is low. Primary hazards to personnel working with BSL2 agents relate to accidental percutaneous or mucous membrane exposures, or ingestion of infectious materials. BSL2 is appropriate when work is done with any human-derived blood, body fluids, or tissues where the presence of an infectious agent may be unknown. See Appendix 2 for a complete list of BSL2 criteria.

**Biosafety Level 3**

BSL3 is applicable to clinical, diagnostic, teaching, research, or production facilities in which work is done with indigenous or exotic agents which may cause serious or potentially lethal disease as a result of exposure by the inhalation route. Laboratory personnel have specific training in handling pathogenic and potentially lethal agents, and are supervised by competent scientists who are experienced in working with these agents. Primary hazards to personnel working at BSL3 relate to autoinoculation, ingestion, and exposure to infectious aerosols. See Appendix 3 for a complete list of BSL3 criteria.

**Biosafety Level 4**

BSL4 is required for work with dangerous and exotic agents which pose a high individual risk of aerosol-transmitted laboratory infections and life-threatening disease. Agents with a close or identical antigenic relationship to BSL4 agents are handled at this level until sufficient data are obtained either to confirm continued work at this level, or to work with them at a lower level. Members of the laboratory staff have specific and thorough training in handling extremely hazardous infectious agents; and they understand the primary and secondary containment functions of the standard and special practices, the containment equipment, and the laboratory design characteristics. They are supervised by competent scientists who are trained and experienced in working with these agents. Access to the laboratory is strictly controlled by the laboratory director. The facility is either in a separate building or in a controlled area within a building, which is completely isolated from all other areas of the building. A specific facility operations manual is prepared or adopted.

Within work areas of the facility, all activities are confined to Class III biological safety cabinets, or Class II biological safety cabinets used with one-piece positive pressure personnel suits.
ventilated by a life support system. The BSL4 laboratory has special engineering and design features to prevent microorganisms from being disseminated into the environment.

\(^1\)Ref: Biosafety in Microbiological and Biomedical Laboratories. Centers for Disease Control and Prevention, and National Institutes of Health, 1993.

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<th>Biosafety Level</th>
<th>Risk Assessment</th>
<th>Practices and Techniques</th>
<th>Safety Equipment</th>
<th>Examples</th>
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<tr>
<td>BSL1 Basic Laboratory</td>
<td>Individual risk: Low Community risk: Low</td>
<td>Standard Microbiological Practices.</td>
<td>None: primary containment provided by adherence to standard lab practices during open bench operations.</td>
<td>E. coli K12; S. cerevisiae; short term, long term culture of most non-primate mammalian cells.</td>
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<tr>
<td>BSL2 Basic Laboratory with biosafety cabinets and other physical containment devices as required</td>
<td>Individual risk: Moderate Community risk: Low</td>
<td>Level 1 practices plus: lab coats; autoclaving all biological waste preferred; limited access; biohazard warning signs on doors and equipment.</td>
<td>Partial containment (i.e., Class I or II biosafety cabinets) for procedures which produce aerosols.</td>
<td>E. coli O157; Hepatitis B virus; Salmonella typhimurium; human blood; Neisseria gonorrhoeae; culture of lymphoid lines carrying inducible EB; many common human pathogens.</td>
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<tr>
<td>BSL3 Containment Laboratory with special engineering and design features</td>
<td>Individual risk: High Community risk: Low</td>
<td>Level 2 practices plus: special protective clothing; controlled access through entrance room; biological waste must be autoclaved, preferably within the</td>
<td>Partial containment equipment used for all manipulations of infectious materials; directional airflow.</td>
<td>Yellow fever virus; M. tuberculosis; Industrial scale volumes of HIV.</td>
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LIST OF FACULTY AND THEIR CURRENT RESEARCH
TENNESSEE STATE UNIVERSITY
DEPARTMENT OF AGRICULTURAL SCIENCES

Dr. Lan Li:  
Agricultural Economics, TSU Main campus, Nashville  
(615) 963-4935; lli@tnstate.edu

Lan Li, Ph.D. and Research Assistant Professor in Agricultural and Resource Economics Dr. Li conducts empirical economic research. Her overall research interest lies in microeconomic issues that are cause-and-effect in nature, entail hypothesis testing, and involve data analysis and econometrics modeling. Her research fields are (1) in terms of research topics, food retailing and marketing, price and demand analysis, market structure and competition, firm strategies, and other empirical industrial organization issues; and (2) in terms of methodologies, economic statistics (i.e., econometrics) and data science, micro-econometrics, and panel econometrics. Dr. Li’s current research has more focus on fresh produce markets and industries.

Dr. Li’s ongoing projects include (1) a project that assesses “food desert” conditions and affordability and accessibility of healthy foods, and examines the impact of the food environment on consumers’ dietary choices and demand for fruits and vegetables; (2) a project that examines local/regional food systems for fresh product and related issues on small farms; (3) empirical issues on fruit and vegetable consumption in the American diet and its effect on the prevalence of obesity. Dr. Li also carries out other projects with collaborators and teams on (a) retail price analysis, pricing strategies and competition, farm-retail price transmission; (b) product differentiation and food labeling; (c) advertising and promotions (d) network science and its applications for small farms and rural communities.

Dr. Li teaches three graduate level courses: Statistics for Research Workers in Fall and Decision-making in Agribusiness-Quantitative Applications and Food Marketing and Retail Management in Spring.

Career Opportunities: Food & Beverage Manger; Operations Manager - Agribusiness; Loan Officer; Multinational food and Feed Corporations-- Entry and mid level managerial positions; Credit analyst Officer; Production Supervisor; Relationship manager- Agribusiness; Regional Sales Manager; research and Development Specialist; Sales Representative; Resource Economists; Foreign Policy analyst; Federal and State Governments; USDA/ERS/ Marketing; Consumer Researcher; Business, agribusiness, government agencies, non-profit organizations. Lots of opportunities for admission into PhD programs in agricultural, resource, and environmental economics.

Dr. Jason Oliver:  
TSU Entomology Program- Nursery Crop Research Center, McMinnville.  (931) 668-3572; joliver@tnstate.edu

The TSU Entomology research program is directed by Dr. Jason Oliver and is located at the Otis L. Floyd Nursery Research Center, McMinnville, TN. The research emphasis of the Entomology
Program is integrated pest management and biologically-based approaches in the control of important ornamental nursery pests, including imported fire ants, Japanese beetle, and wood-boring insects (e.g., flatheaded borers, ambrosia beetles, and walnut twig beetle). Current program projects include: 1) introduction of phorid-decapitating parasitic flies from South America to control imported fire ants in Tennessee, 2) development of new effective traps for wood-boring insects, 3) development of new quarantine treatments for imported fire ants and Japanese beetle, 4) evaluation of biopesticides as alternative nursery stock treatments for fire ants, Japanese beetle, and ambrosia beetles, 5) management of ambrosia beetles through manipulation of semiochemicals, and 6) development of systemic insecticide treatments for flatheaded borers and evaluation of their interaction with herbicides. The Entomology program is currently funded by USDA-ARS, USDA-APHIS, U.S. Forest Service, and the Tennessee Department of Agriculture.

Dr. George R. Smith PhD RLA: Community Planning and Landscape Architecture
Assistant Professor Research Program in Technology-Assisted Environmental Education, TSU Main campus, Nashville 615-963-1233; gsmith6@tnstate.edu

Dr. Smith is currently funded to undertake a three year-long USDA capacity building project involving a water quality research and Extension/outreach project focused on impacts of urbanization on agriculture and rural counties. This project commences in September 2013 and will provide several graduate and undergraduate students with stipends and graduate assistantships over the next three years. A key objective is to attract students to Tennessee State University and engage and train existing student participants as volunteers or paid assistants in project execution, workshops, and related for-credit courses.

This USDA Capacity Building Grant will focus on remediation of negative impacts on agriculture, environmental quality and health and wellbeing of rural community residents caused by urbanization of rural Tennessee counties. This issue is especially relevant to counties located adjacent to major urban centers including Nashville, Memphis, Chattanooga and Knoxville that are experiencing rapid urbanization. The primary objective is to create a research and technology-based user friendly interactive educational opportunity for rural county stakeholders. We will accomplish this task by providing access to current relevant environmental education to stakeholders in Williamson County. Tools include iPads to assist in on-site and online research and educational content delivery, 3-D printer technology which has great potential as a powerful communication and problem-solving tool, and complimentary digital modeling technology.

Williamson County is a rapidly urbanizing rural county located adjacent to Davidson County and Nashville. Williamson County is proposed as the testing ground for the development of the new community Resource and Economic Development State Action Agenda. Williamson County illustrates many of the environmental issues common to most other urbanizing counties in the state, including degradation of water quality and reduction of water quantity, the essential resources necessary for profitable agricultural production. To sum up, we will undertake baseline data collection and develop content to create a comprehensive extension education program built on a hybrid education delivery system combining on-ground and online interactive environmental education content. Successful completion of this Capacity Building project will enable us to scale up the State Action Agenda for delivery across Tennessee.

planning, architecture, civil engineering, design, construction, forestry and natural resource management, environmental planning, government (USDA, Department of Parks, Department of Forestry, Department of Defense, and Bureau of Land Management) and education. Graduates of Bachelor of Science in Landscape Architecture Programs across the nation are employed in many fields including urban planning, architecture, civil engineering, design, construction, forestry and natural resource management, environmental planning, government, education, and non-profit organizations. Graduates from American programs in Landscape Architecture also find employed in Canada and South American countries such as Brazil, in Europe, Australia and Asia including China.

Dr. Ying Wu: Nutrition-Food Technology, TSU Main Campus; (615) 963-5824; Assistant Professor ywu@tnstate.edu.

Dr. Ying Wu’s research activities focus on extracting health-promoting components from various agri-products and by-products, investigating the structure-function relationships of different molecules, and evaluating synergistic interactions of polymers in mixed systems. Her research covers physical, chemical and physiological properties of health-promoting components, and the application of these components into different areas, such as dietary-fiber fortified food, and encapsulation of bioactive compounds etc. using various techniques. Dr. Wu will explore local agricultural resources in Tennessee and develop food products with health benefits and enhanced quality.

Project 1. Soybean Dietary Fiber: A Functional Ingredient for Prevention of Childhood Obesity. Many factors, such as social, economic, demographic, lifestyle and dietary patterns, may contribute to the likelihood of developing overweight and obesity among children. High fiber diets are important in the prevention and management of obesity and chronic diseases, including type2 diabetes, heart disease and cancer. However, incorporation of fiber ingredients to food products is challenging due to the adverse effect on texture and sensory quality of the products. This research will study the beneficial rolls of different fractions of soybean polysaccharides as a source of dietary fiber to prevent obesity and other diseases, as well as maintain the textural and sensorial quality of food products with increased level of fiber fractions.

Project 2. Antioxidant and Anticancer Activities of a Novel Biomaterial. This project aims to investigate antioxidant and anticancer activities of a novel biomaterial extracted from agricultural products. The objective of this project is to understand the antioxidant and immune-pharmacological activities of this novel material. The current project is designed for a rapid determination of its biological roles. A further investigation will be followed by studying its interactions with other natural antioxidants extracted from herbal plants, and its protective effect over other antioxidants while used as a stabilizer or wall material in emulsion or micro/nanoencapsulations.

Dr. Fur-Chi Chen: Food Science, TSU Main campus, Nashville Associate Professor (615) 963-5410; fchen1@tnstate.edu

Research Summary
- Developing molecular fingerprinting and biosensor methods for the detection of Salmonella and Campylobacter in foods
- Developing immunoassays for food safety applications including detection of food allergens, toxins, and adulterants.
Since the 1950s, cities have transitioned from a largely agricultural focused society resulting in rapid urban development. This increase in population has resulted in the intermingling of homes and communities with forests and agriculture land. The State of Tennessee boast a unique landscape, with approximately 50% forested land cover, and a population of 6.45 million people from diverse backgrounds and culture.

As growing cities are making more room for trees, Tennessee State University’s Urban Forestry Research Program seeks to assist natural resource and environmental professionals, policy makers, and society-at-large in the management and care of trees in ‘urban’ areas. Urban forestry is the planting, management, and care of trees in our –or- what might be deemed ‘the forest where we live.’ Trees are valuable asset that have aesthetic value, improve air quality, increase water quality, reduce noise pollution, and provides habitat for wildlife. Additionally, not only do they provide environmental benefits, but trees provide economical benefits as well. Urban trees increases residential and business property values. They also enhances community pride, and increase recreational opportunities.

TSU’s Urban Forestry Research/Extension program goal is to improve Tennessee’s urban environments through the creation of outreach material driven by research to better understand the urban forests and urbanization. Specific research interests include: green infrastructures, best management practices (BMPs), urbanization, storm water quality, urban forestry management and hydrological modeling.

Dr. Fisseha Tegegne:  
Agribusiness/Agricultural Economics, TSU Main campus, Nashville  
Professor  
(615) 963-5830; ftegegne@tnstate.edu

Dr. Tegegne is involved in the following research projects:
An alternative enterprise for small farmers-the pigeonpea project, nearing completion, is an example. Among other issues the project involved assessment of yield from different varieties as well as evaluated its adaptability to Tennessee soil and climatic conditions. The project has both research and outreach components. On campus field trials and planting on farmers’ plots were done.

A study of network among small farmers-this project examines collaboration among farmers in terms of sharing production, marketing information and resources and its contribution to viability of small farms and rural communities. A face to face survey is used to identify specific challenges and opportunities they face. The study focuses on produce growers.

Nursery and greenhouse operations in Tennessee-this study relates to challenges and opportunities that the businesses face in terms of consumer demand for nursery products, need for skilled personnel, and the influence of energy cost on their profitability. A mail survey is used to acquire data from the businesses.
**Career Opportunities:** Food & Beverage Manager; Operations Manager - Agribusiness; Loan Officer; Multinational food and Feed Corporations-- Entry and mid level managerial positions; Credit analyst Officer; Production Supervisor; Relationship manager - Agribusiness; Regional Sales Manager; Research and Development Specialist; Sales Representative; Resource Economists; Foreign Policy analyst; Federal and State Governments; USDA/ERS/Marketing; Consumer Researcher; Lots of opportunities for admission into PhD. programs.

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**Dr. Hongwei Si:**
**Nutrition; TSU Main campus, Nashville**  
**Assistant Professor**  
(615) 963-5443; His@tnstate.edu;

**Area:** Investigate the beneficial effects of plant-derived chemicals and whole food/plant extracts on human diseases including obesity, aging, diabetes and cardiovascular diseases using cells and animals

**Approach:**
1. Various human and animal cells are cultured to assess beneficial effects (anti-inflammation, anti-oxidant, anti-aging, anti-obesity etc) of plant-derived chemicals. Currently, we have 6 human and animal cells available in my lab
2. Animals: mice/rats and other animals are feed with individual chemicals, whole extract of foods/plants. Animals are housed in the special facility (right now in Meharry Medical College), samples from the animals will be analyzed in my lab
3. Molecular assays including the expression and activity of protein, DNA/RNA

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**Dr. Naseer Aziz:**
**Molecular biology/Plant breeding; TSU Main campus, Nashville**  
**Associate Professor**  
(615) 963-1595; aaziz@tnstate.edu

Molecular Markers- A link between biotechnological advances and traditional breeding:

Our lab is studying the genetic makeup of cotton breeding lines in collaboration with USDA Genetics and Precision Agriculture Research Unit at Mississippi State University. We are currently using DNA based markers and progressing towards using RNA based studies of gene expression. This project is also using micro-manipulation techniques for single gamete isolation. These techniques can therefore provide trainings in various molecular tools that are essential for plant molecular breeding, patent/forensic applications as well as assessing biodiversity for environment issues.

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**Dr. Suping Zhou**
**Plant physiology/molecular biology; TSU Main campus, Nashville**  
**Associate Professor**  
(615) 963-2146; Zsuping@tnstate.edu

In a broad sense, today’s world is facing a perplexing situation due to rapid population growth and fast diminishing natural resources. To solve the problems including soil contamination with toxic metals and salinity, food contamination with various food transmitted human pathogens, and finding solutions to develop renewable energy so that to harness the ever-increasing energy prices are important issues for the scientific research and development.
Our research projects aim at providing better understanding plant responses to various suboptimal environmental conditions such as salt, drought and metal toxicity at molecular and physiological levels, and using the scientific information gained from the research work to develop new varieties that would produce better yield and quality products. We also work toward finding new ways to convert renewable plant materials into various organic compounds that have important industrial applications.

Our research projects are conducted in collaboration with USDA-ARS federal laboratories led by Dr. Ted, Thannhauser in Ithaca, NY, and Charles Lee in Albany, CA, and other land-grant and private universities including Cornell University, Langston University, Vanderbilt University. We have also leveraged bioinformatics resources from Department of Energy and Pittsburg Super-computer Center. To develop molecular association networks that can be used to improve plant resistance, the most current proteomics technology was employed, to develop new tools for the detection of human pathogens on fresh fruits. Genomics analysis using next generation sequencing technology and bioinformatics tools were used to find new genes that have potential use in developing renewable energy resources.

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**Dr. Jason De Koff:**
Agronomy/Biofuels; TSU Main campus, Nashville
Assistant Professor
(615) 963-4929; Jdekoff@tnstate.edu

My work is focused on bioenergy crop production. Currently, we are looking at switchgrass for bioenergy and how switchgrass quality changes over the growth period as well as with changes in temperature and rainfall. Switchgrass at the TSU research farm in Nashville is harvested several times each year and analyzed for specific quality characteristics that may influence its energy conversion capabilities. This research will help farmers identify the best times to harvest switchgrass to provide the best quality feedstock for the cellulosic ethanol industry.

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**Dr. Richard Browning:**
Animal Science/Physiology; TSU Main campus, Nashville
Professor
(615) 963-5837; rbrowning@tnstate.edu

Dr. Browning’s research is focused on genetic evaluation for economically important production traits. The primary emphasis is on female fitness (i.e., survival and reproduction). Four breeds are under assessment along with one breed cross. Disease control through genetic management is an important area of sustainable food animal management. This research focus has become important across livestock species at the whole animal and molecular levels. The emerging meat goat industry lags behind beef cattle and other food animal sectors for basic information on breed characterization and utilization for producers to access for enhanced enterprise success. Research in this laboratory addresses these industry deficiencies. Potential employers include any research facility with a focus on mammalian physiology or applied genetics. There is ample crossover that employment opportunities within a biomedical research program are just as viable as within a livestock research program.
**Dr. Enefiok Ekanem:**  
Agribusiness/Agricultural Economics/Food Safety; TSU Main campus,  
Professor Nashville; (615) 963-5823; eekanem@tnstat.edu

Agricultural Economics/Marketing; TSU Main campus, Nashville (615) 963-5823;  

Dr. Ekanem’s current research involves goat meat marketing. This project focuses on marketing of goat meat in Tennessee. Marketing channels and issues affecting producers, processors, retailers and consumers are explored in this project.

**Opportunities for Student Learning:** Students are trained to conduct research and perform data analysis. They learn how to design survey instruments, collect primary, secondary data and use software such as the Statistical Package for the Social Sciences (SPSS) and Microsoft Excel for analyzing, summarizing and presenting data. In addition, students learn to develop proposals and prepare manuscripts for presentation and publication. Students develop marketable skills for employment or accepting internships in government or private organizations.

**Other Areas of Research/Interest:** Statistical applications, economics of food safety, obesity, agricultural biotechnology, small farm issues, consumer preferences, agro-tourism, trade and marketing.

**Career Opportunities:** Food & Beverage Manager; Operations Manager-Agribusiness; Loan Officer; Multinational Food and Feed Corporations-- Entry and mid-level managerial positions; Credit Analyst Officer; Production Supervisor; Relationship manager- Agribusiness; Regional Sales Manager; Research and Development Specialist; Sales Representative; Resource Economists; Foreign Policy analyst; Federal and State Governments; USDA/ERS/ Marketing; Consumer Researcher; Lots of opportunities for admission into PhD programs.

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**Dr. E. Kudjo Dzantor:**  
Environmental Science/Phytoremediation; TSU Main campus,  
Associate Professor Nashville; (615) 963-1839; edzantor@tnstate.edu

Dr. Dzantor’s research is in the following areas:

- Bio/Phytoremediation—use of bacteria, plant, algal systems for cleaning up environmental contamination
- Biomass biofuel production using plants (cellulosic herbaceous perennials (CHPs))
- Biomass biofuel production using microalgae
- Environmental implications of large-scale biomass biofuel production and use
- Plant-microbe interactions that are important in agriculture and environmental protection and enhancement (e.g., N₂ fixation and AM symbioses)

**Career Opportunities**

- Environmental biotechnologies—environmental assessment, cleanup, restoration
- Emerging bioenergy/biobased industries—biofuels, fine chemicals, pharmaceuticals, food supplements
- Research—academia, research laboratories (public, private)
Dr. Samuel O. Dennis:  Plant and Soils/water quality, TSU Main campus, Nashville  
Associate Professor  615. 963. 5822, sdennis@tnstate.edu  

Area of Specialization: Environmental Soils and Water Quality  
Applied Research:  
• Watershed Assessment and Management (Land-use, BMPs, communicating watershed data to stakeholders)  
• Surface water monitoring for nutrient contaminants including contaminants vulnerability (at watershed scale); assessment of water quality parameters in streams (as a function of in-field nursery crop production systems).  
• Soil Carbon sequestration potential of common agricultural systems.  
• Determining soil physico-chemical properties  
• Determining cations, anions and trace elements in soil solution.  

Opportunities:  
• Advance degree in agronomy, soils, environmental science.  
• Job opportunities with federal agencies eg EPA, NOAA, USDA, USGS  
• State county agents (agriculture & natural resource agents)  
• State and county regulatory agencies (TDEC)  
• State Ag. Department  
• Sales (with environmental, instrumentation companies, Farmers Coop, Home depot etc)  
• Teach Science at middle and high school if training is combine with Ag Ed courses.  

Dr. Dharma Pitchay:  Plant Physiology/Nutrition; TSU Main campus, Nashville  
Assistant Professor  (615) 963-4890; dpitchay@tnstate.edu  

Dr. Pitchay specializes in organic and conventional horticultural program focusing on physiology of plant nutrition, substrate formulation, hydroponics, soil fertility, and establishing seedlings and vegetative rooted cuttings for greenhouse, nursery field production. My research goal is to develop a system to reduce the usage of chemical inputs and minimize pollutants, and to improve the nutritive value of food crops. Also, providing information needed for the whole plant management system includes cultural practices specific to local environment and to improve plant quality. There are excellent job opportunities for graduate students majoring in plant nutrition.  

Career Opportunities:  
• Advance degree in horticulture  
• Job opportunities with federal agencies eg, USDA  
• State county agents (agriculture & natural resource agents)  
• State Ag. Department  
• Sales (with environmental, instrumentation companies, Farmers Coop, Home depot etc)  
• Teach Science at middle and high school  
• Private business  

Dr. Agnes Kilonzo-Nthenge:  Food Science/Food Safety; TSU Main campus, Nashville  
Assistant Professor  (615) 963-5437; akilonzontheng@tnstate.edu
Dr. Kilonzo’s areas of research interest include evaluation of microbial safety of meats and fresh produce. Her research focuses on antibiotic-resistant foodborne pathogens including *Escherichia coli* O157:H7, *Salmonella*, *Campylobacter*, *Cronobacter sakazakii*. Other areas of interest include consumer education relating to food safety. Students will be in a position to demonstrate technical competency skills in food microbiology necessary to provide quality service in food industry. Potential employers include food industry, USDA, universities, and other government regulatory agencies.

**Career Opportunities:**
- Advance degree in food science/food safety
- Job opportunities with federal agencies eg. USDA and private food manufacturing industry
- State Ag. Department
- Teach Science at middle and high school
- Private business
- Research and development

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**Dr. John C. Ricketts:**  
Agricultural Education, TSU Main campus, Nashville  
Associate Professor  615-963-7620; jricket1@tnstate.edu

A summary of Dr. John Ricketts’ research can be seen in Figure 1. The context of his research program is secondary and post-secondary agricultural and leadership education. Specifically, he works on problems associated with student achievement in the aforementioned context. Variables of interest under investigation are leadership skills and behavior, critical thinking dispositions and skills, and academic (science, math, etc…) achievement of students in secondary and post-secondary education. Process variables investigated include teacher needs, experiences, efficacy, and instructional methods and student experience, learning style, and demographics.

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**Figure 1. Current Conceptual Model of Research.**
**Dr. Korsi Dumenyo:** Plant Pathology/Biotechnology, TSU Main campus, Nashville
*Assistant Professor* (615) 963-5634; cdumenyo@tnstate.edu.

Our main goal is to engage in hypothesis-driven research to understand plant disease and generate knowledge that can be used to manage the diseases and reduce their impact on farming operations. In this endeavor we use genetic, biochemical and molecular tools to perform experiments and answer fundamental and applied questions about the disease-causing organisms, the host and the disease process. Our current projects are on bacterial diseases of soft rot and cucumber wilt which are respectively caused by *Pectobacterium* species and insect-vectored *Erwinia tracheiphila*. Career opportunism for graduates from our lab include, many branches of USDA, other non-USDA federal agencies, Agro companies, state, county and city governments and higher educational institutions.

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**Dr. Samuel Nahashon:** Poultry Science/Biotechnology, TSU Main campus, Nashville
*Professor* (615) 963-2575; snahashon@tnstate.edu

Dr. Nahashon’s research involves the use of biotechnological tools to expand the understanding of the mechanisms that control feed utilization/feed efficiency and excessive fat deposition in poultry. Over the years, extensive genetic selection for rapid growth and feed conversion has led to increased fat accumulation in broilers. Such fat is usually not desired by the consumer and also it becomes a liability to the poultry processors as an added cost because it must be disposed off appropriately. Therefore, to prevent value loss and these additional costs, there is effort to use genetic manipulation to reduce excess fatness in chickens. The lab also evaluates nutrient requirements of poultry with the aim of improving poultry performance while minimizing the cost of feeding. The lab pursues an understanding of the contribution of the genome and proteome of birds to traits such as excessive fat deposition and feed efficiency. These efforts will improve growth, quality of products and production performance of poultry and ensure profitability. The lab also evaluates the modes of action and potential for beneficial bacterial organisms to improve growth performance of birds and also minimize the use of antibiotics in poultry.

Potential employers: poultry industry, academia, State and Federal Government, research etc. There is great potential for pursuing doctoral degree programs.

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**Dr. Prabodh Illukpitiya:** Agribusiness/Economic Research in Green Energy and Nursery
*Assistant Professor* Crop Production TSU Main campus, Nashville; (615) 963-5435;

Dr. Illukpitiya’s research focuses is on economics of bioenergy and nursery crop production. His current research on bioenergy focus on economic competitiveness of cellulosic feedstock, environmental benefits including net energy balance, efficiency of energy crop farming and biomass market premiums. His research focus on nursery and greenhouse crop production include development of decision making tools in plant production cost estimates, technical efficiency improvement, risk management and marketing. The other areas of research interest include topics in environmental and resource economics, ecological economics and production economics.
If you would like to know more about potential research in green energy, nursery crop production or other areas in agricultural economics, feel free to contact:

**Dr. Solomon Haile:** Forestry and Applied GIS, TSU Main campus, Nashville  
*Assistant Professor*  
(615) 963-5445; shaile@tnstate.edu

Research areas of interest:

1) Integrated agroforestry systems for bioenergy—the combination of agricultural energy crops and forestry to create integrated, diverse and productive land use systems.  
2) Ecosystems services of urban Forests

Dr. Haile is currently investigating the use of agroforestry system as integrated feedstock production for energy — a switch grass and loblolly pine trees combinations. The objectives of the project are: 1) to assess the performance of switch grass as energy crops in an integrated agroforestry bioenergy production setting, and 2) to evaluate impacts of switch grass cultivation in an integrated agroforestry system on critical soil properties, and carbon sequestration in marginal lands.

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**Dr. Surendra P. Singh:** Agribusiness/Agricultural Economics, International Development  
TSU Main campus, Nashville  
*Professor*  
(615) 963-5829; ssingh@tnstate.edu

Dr. Singh’s has had extensive research experience and interest in developing applications over a wide range of subject matter areas. The fundamental focus of his work has been in areas and problems dealing with small and part-time farms, sustainable agriculture, marketing of agricultural products, and analysis of changes in industry structure, rural development and agribusiness development. Dr. Singh also has wide experience in international development and has conducted research or has served as consultant in several countries including Cambodia, Indonesia, India, South Africa, Turkmenistan, Thailand, and Uganda.

**Career Opportunities:** There is tremendous potential for growth and opportunities in the field of Agribusiness/Agricultural Economics. Personnel with Agribusiness training are critical to both private and public sector agencies and organizations. **Examples of job opportunities are:**  
- Food & Beverage Manager;  
- Operations Manager - Agribusiness;  
- Loan Officer;  
- Multinational food and Feed Corporations-- Entry and mid level managerial positions;  
- Credit analyst Officer;  
- Production Supervisor;  
- Relationship manager- Agribusiness;  
- Regional Sales Manager;  
- Research and Development Specialist;  
- Sales Representative;  
- Resource Economists;  
- Foreign Policy analyst;  
- Federal and State Governments;  
- USDA/ERS/ Marketing;  
- Consumer Researcher;  
- and opportunities for admission into PhD. programs.

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**Dr. John L. Hall**  
Agricultural Education and Leadership; TSU Main campus, Nashville  
*Assistant Professor*  
615-963-5139; Jhall33@tnstate.edu

Dr. Hall's research focus is on leadership program development in agricultural contexts. Agricultural contexts are broadly defined to include, but are not limited to:
- Traditional and non-traditional agriculture topics
- Formal and non-formal educational settings
- Youth, college students, and adults

As a researcher he seeks to discover and implement effective programs that allow individuals, organizations, and communities to develop and refine leadership skills and competencies. The programs utilize a variety of resources such as: youth and adult leadership models, theories, and experiential application.

Audiences include but are not limited to:

- Agriculture & CTE Teachers/Extension Agents
- Agriculture Business & Community Leaders
- College Students & Organizations
- College Faculty and Staff
- K12 Faculty and Staff
- Various Youth Organizations (FFA/4H)

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Dr. Desh Duseja: Soil Sciences/ Environmental Chemistry/Agronomy
Professor TSU Main Campus, LH106B
615-963-5439 dduseja@tnstate.edu

Areas of Specialization --- Research Interests:

- Courses taught: Fundamental of Soils; Soil Fertility, Soil Environmental Chemistry/ Soil & Water Conservation; Soil Physics; Soil & Plant Analysis (Graduate); Soil Classification (both Graduate & Undergraduate levels)

- Past Research/Educational Projects:
  - Contaminant (organic waste; heavy metals; pesticides) behavior in soils; Water quality
  - Soil Fertility and Nutrient management
  - Herbicide behavior/movement in soils/water --- modeling
  - Container Nursery Crop Production Research: Biopesticides
  - Assessment of Water Wells in rural and urbanizing communities
  - Developing-pigeon pea as a viable cash crop on small farms through research & outreach
  - Assessing the potential use of pigeon pea stalk as a feed stack for Bioenergy

- Current-Research/ Educational Projects/ Proposals :
  - Promoting pigeon pea production for limited resource famers of Tennessee as a food, forage and soil improving cover crop
  - Development and Implementation of an Environmental Baccalaureate Academic concentration at Tennessee State University
  - International perspectives on strengthening Environmental Sciences curricula at TSU
  - Revisiting Soil testing and fertilizer recommendations for vegetable crops in Tennessee:
    A proposed project for the US National Science Foundation
## APPENDIX D
### Research Faculty in the Department of Agricultural and Environmental Sciences

<table>
<thead>
<tr>
<th>Faculty Last Name</th>
<th>Faculty's First Name</th>
<th>Title</th>
<th>Department</th>
<th>Location - Campus</th>
<th>Office Location and Number</th>
<th>Telephone Number (Area Code)</th>
<th>Email Address</th>
<th>Field of Research</th>
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<tbody>
<tr>
<td>Dabbas</td>
<td>Dalia</td>
<td>Research Assistant Professor</td>
<td>Agricultural Sciences</td>
<td>Main Campus</td>
<td>Farrell-Westbrook #202H</td>
<td>615-963-5616</td>
<td><a href="mailto:dabbas@tnstate.edu">dabbas@tnstate.edu</a></td>
<td>Forestry</td>
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<tr>
<td>Ahmad</td>
<td></td>
<td>Research Assistant Professor</td>
<td>Agricultural Sciences</td>
<td>Main Campus</td>
<td>Farrell-Westbrook #204F</td>
<td>615-963-1595</td>
<td><a href="mailto:aaziz@tnstate.edu">aaziz@tnstate.edu</a></td>
<td>Plant science-biotechnology</td>
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<tr>
<td>Browning, Jr.</td>
<td>Richard</td>
<td>Research Associate Professor</td>
<td>Agricultural Sciences</td>
<td>Main Campus</td>
<td>Farrell-Westbrook #202D</td>
<td>615-963-5837</td>
<td><a href="mailto:rbrowning@tnstate.edu">rbrowning@tnstate.edu</a></td>
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<td>Bullock</td>
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<td>Extension Professor</td>
<td>Agricultural Sciences</td>
<td>Main Campus</td>
<td>Farrell-Westbrook #214E</td>
<td>615-963-5449</td>
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<td>615-963-4887</td>
<td><a href="mailto:aclardy@tnstate.edu">aclardy@tnstate.edu</a></td>
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<td>Sam</td>
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<td>Main Campus</td>
<td>CARP #207</td>
<td>615-963-5822</td>
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<td>Agricultural Sciences</td>
<td>Main Campus</td>
<td>Farrell-Westbrook #214C</td>
<td>615-963-4929</td>
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<td>Plant Science-Biofuels</td>
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<td>CARP #111A</td>
<td>615-963-5434</td>
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<td>615-963-5445</td>
<td><a href="mailto:shaile@tnstate.edu">shaile@tnstate.edu</a></td>
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<td>Phone</td>
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<td>Plant Pathology</td>
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<td>Position</td>
<td>Department</td>
<td>Campus</td>
<td>Office</td>
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