College of Engineering Sciences, Technology and Agriculture

The College of Engineering Sciences, Technology and Agriculture (CESTA), is the second oldest college at Florida A&M University. This college provides the foundation for the land-grant status of Florida A&M University. CESTA consists of four major component areas: 1) The Academic Programs (undergraduate and graduate) component, that consists of three divisions: a) The Division of Agricultural Sciences; b) The Division of Engineering Sciences and Technology and c) The Division of Naval Sciences; 2) The Research and Technology Development Programs component (basic and applied) serves to enrich and broaden the knowledge and research base of the citizens of Florida, the nation and the world in agriculture, food and engineering sciences and technology. Significant research is being conducted in the following research Centers: a) The Center for Biological Control, b) The Center for Water Quality, c) The Center for Viticulture Sciences and Small Fruit, d) The Research and Extension Center, in Quincy, e) The Center for Domestic and International Agricultural Trade, Development Research and Training, f) John A. Mulrennan, Sr., Public Health Entomology Research and Education Center, in Panama City. All of these Centers offer our students excellent opportunities to conduct meaningful research. 3) The Cooperative Extension/Outreach Programs is the outreach arm of CESTA. Through this component, research-based educational information and technical assistance are provided to our clientele throughout the state, and especially in the panhandle region; and 4) The International Agricultural Programs component seeks to ensure the global competitiveness of our students and strengthen the services provided to our stakeholders in an increasingly complex and dynamic global marketplace.

The objectives of the college are to afford students a general education that will assist them in living a full and well-balanced life; to offer courses and other specialized instruction required by students enrolled in the programs of agricultural sciences, engineering sciences, and engineering technology; to enable the graduates to undertake graduate or professional study or to enter directly into rewarding careers in business, industry, or government and to foster opportunities for undergraduate, graduate and faculty research. The course requirements for the scientific and technical programs may change due to on-going curricular modernization. Students entering the College of Engineering Sciences, Technology and Agriculture are required to have a strong background in mathematics and the sciences, and to have an overall minimum GPA of 2.0. All students will be required to obtain a grade of “C” or better in all major courses and a minimum GPA of 2.5 in all major required electives. All students are strongly encouraged to participate in internship programs, and volunteering/community service activities, which are offered through CESTA, the University Career Center and the Office of Community Activities Volunteering Services, respectively.

CESTA Forum/Colloquium

Students (undergraduate and graduate) are required to register in the appropriate CESTA Forum/Colloquium course each semester of enrollment. Attendance and participation are mandatory for an S/U grade. Failure to participate will result in the student receiving an unsatisfactory grade. CESTA reserves the right to withhold the recommendation for graduation of any student who does not conform to these requirements.

Degrees Offered

Associate In Arts In Forestry And Natural Resources Conservation (2+2), with the University of Florida
Bachelor of Science In Agribusiness
Bachelor of Science In Biological And Agricultural Systems Engineering (BASE), with options in:
- Natural Resources Engineering
- Bio-processing Engineering
Bachelor of Science in International Agriculture and Business
Bachelor of Science In Landscape Design And Management
Bachelor of Science In Agriculture, with options in:
- Agricultural Education
- Agronomy
- Animal Science
- Entomology
- Food Science
- Ornamental Horticulture
Bachelor of Science in Civil Engineering Technology, students may choose the option:
- Surveying Technology
Bachelor of Science in Construction Engineering Technology
Bachelor of Science in Electronic Engineering Technology
Master of Science in Agricultural Sciences*, with concentrations in:
- Plant/Soil Science
- Animal Science
- Food Science
- Agribusiness
- Entomology
Ph.D. in Entomology in cooperation with the University of Florida*
*(See School of Graduate Studies for details)

Scholarships Offered

Listed below are the scholarships normally offered in the College. For more information, please contact the Divisional Offices or the Office of the Associate Dean for Academic Programs. Students may apply for any of these scholarships online at our website at http://www.tamu.edu/acad/colleges/cesta/scholarships.html.

- The Dwight D. Eisenhower Scholarship valued at $22,000 per year for engineering technology students studying transportation.
- The Gainesville Regional Electricity Scholarships for freshmen in Electronic Engineering Technology.
- The Hensel-Phelp Scholarship for juniors and seniors in Construction/Civil Engineering Technology.
- The Ray Long Alumni Scholarship valued $500 per year for Engineering Technology majors.
- The URS-Greiner, Incorporation Scholarship valued at $1,000 per year and available to Construction/Civil Engineering Technology majors.
- The USDA Forest Service Scholarships for freshmen and sophomore Forestry and Natural Resource Conservation majors values at $3,000 per semester.
- The Ruben Capeluto Scholarship valued at $1,000 per year and available to Entomology majors.
- The Benjamin L. Perry, Jr. Agricultural Sciences Scholarship for Agricultural Sciences majors.
- The Florida Rural Rehabilitation Corp. Agricultural Sciences Scholarship Fund for Agricultural Sciences majors coming from a Florida farm or a rural Florida background.

There are also other assistantships and scholarships sponsored by the College, the USDA Capacity Building Grants Program, Alumni, Professional Organizations and Companies. CESTA scholarships range from $100 to more than $500. Recipients are expected to maintain a minimum GPA of 3.0 per semester. All inquiries about scholarships should be directed through the Office of the Dean.
DIVISION OF AGRICULTURAL SCIENCES

The Division of Agricultural Sciences offers education and training in food and agricultural sciences and agricultural education. In the tradition of the land-grant college, this division seeks to serve the educational needs of the individual student. The curricula in the division also provides for broad training in the humanities, natural sciences, and social sciences mainly during the freshman and sophomore years. The junior and senior years are devoted largely to the professional aspects of the student's area of specialization. In general, the graduation requirement for the Bachelor of Science degree programs is 120 semester hours.

Degrees Offered

The division offers an Associate of Arts degree in Forestry and Natural Resource Conservation and four bachelor of science degree programs: (1) agronomy, (2) international agriculture and business (3) landscape design and management and (4) agriculture with options in animal science, ornamental horticulture, agronomy, entomology and structural pest control, food science and agricultural education. The Division of Agricultural Sciences also offers a master's degree in agricultural sciences and the Ph.D. degree in entomology, in affiliation with the University of Florida.

Faculty

Emeritus Professors: Heinis, Julius; Owens, Clarence B.

Professors: Abdullah, Makola (Dean); Anderson, Sr., Lee E.; Carter, Lawrence; Cilek, James; Colova (Tsolkova), Violetka M.; Flowers, Ralph; Gardner, Cassel; Hubbard, Michael; Hsieh, Yuch; James, Neil; Kanga, Lawrence; Lamber; Leong, Stephen; Magee, Charles; Muchovej, James J; Olorunnipa, Zacch; Onokpise, Ogheneokeme (Associate Dean); Pancholy, Sunil; Pascador, Manuel; Phillips, Bobby R.; Sethil, Mehboob; Smith, John; Thomas, Michael; Thomas, Verian

Associate Professors: Duke, Edwin; Hand, Samuel E.; Kairo, Moses T.K.; Lorenzo, Alfredo; Lu, Jiang; Mbuya, Odemari; Milla, Katherine; Mobley, Ray; Musingo, Mitwe; Petersen, John; Taylor, Jennifer; Worthen, Helen Dreasm; Zhong, He

Adjunct Associate Professors: Bloem, Kenneth; Bloem, Stephanie; Hight, Stephen D.; Legaspi, Jesusa (Susie) C.; Reitz, Stuart R.

Assistant Professors: Barber, Jane A.; Hix, Raymond L.; Park, Hyun-Woo; Peterson, Thomas E.

Instructors: Bolques, Alejandro; Paul, Harriett

Research Associates: Beaudouin, Jean; Epler, John H.; Haseeb, Muhammad; Jackson, Todd; McKenzie-Jakes, Angela; Mazhar, Hifza; Rasmussen, Andrew; Ren, Zhongbo; Wang, Qian

Bachelor of Science in Agribusiness

Agribusiness is an applied field of study integrating the principles of economics, business, management and agriculture. It also involves solving operational problems of agricultural related firms by using modern decision making aids; as well as forecasting and strategic planning. A total of 120 semester hours are required for graduation. Also a minimum of 27 semester hours are required in the major discipline (AEB).

Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Sem.Hrs.</th>
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<tbody>
<tr>
<td>ENC 1101 Freshman Communication Skills I</td>
<td>3</td>
</tr>
<tr>
<td>ENC 1102 Freshman Communication Skills II</td>
<td>3</td>
</tr>
<tr>
<td>MAC 1105 College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MAC 1114 Algebra &amp; Trig. Function</td>
<td>3</td>
</tr>
<tr>
<td>AGG 2004 Intro. to Agric. Science</td>
<td>1</td>
</tr>
<tr>
<td>ECO 2013 Principles of Econ. I</td>
<td>3</td>
</tr>
<tr>
<td>ECO 2023 Principles of Econ. II</td>
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</table>

Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Sem.Hrs.</th>
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<tbody>
<tr>
<td>AEB 2104 Economics of Agriculture</td>
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</tr>
<tr>
<td>STA 2023 Statistics</td>
<td>3</td>
</tr>
<tr>
<td>ACG 2021 Financial Accounting Principles</td>
<td>3</td>
</tr>
<tr>
<td>MAC 2233 Business Calculus</td>
<td>3</td>
</tr>
<tr>
<td>ECO 3101 Microeconomics Theory</td>
<td>3</td>
</tr>
<tr>
<td>AMH 2091 African American History</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td>Directed CESTA Elective</td>
<td>3</td>
</tr>
<tr>
<td>General Education Approved Humanities Electives (2)</td>
<td>6</td>
</tr>
</tbody>
</table>

Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Sem.Hrs.</th>
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</thead>
<tbody>
<tr>
<td>AEB 3331 Agricultural Price Analysis</td>
<td>3</td>
</tr>
<tr>
<td>AEB 3143 Agricultural Finance</td>
<td>3</td>
</tr>
<tr>
<td>QMB 2102 Quantitative Methods (or QMB 3600)</td>
<td>3</td>
</tr>
<tr>
<td>AEB 3300 Marketing of Agricultural Products</td>
<td>3</td>
</tr>
<tr>
<td>ECO 3203 Macroeconomics Theory</td>
<td>3</td>
</tr>
<tr>
<td>AEB Directed Elective</td>
<td>3</td>
</tr>
<tr>
<td>Major Directed Elective</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td>CESTA Directed Electives</td>
<td>3</td>
</tr>
</tbody>
</table>

Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Sem.Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEB 4261 Agric Policy</td>
<td>3</td>
</tr>
<tr>
<td>AEB 4152 Agribusiness Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUL 4130 Business Law</td>
<td>3</td>
</tr>
<tr>
<td>ECO 3421 Econometrics</td>
<td>3</td>
</tr>
<tr>
<td>AEB 4906 Special Problems</td>
<td>3</td>
</tr>
<tr>
<td>MAN 3025 Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>AEB Directed Elective</td>
<td>3</td>
</tr>
<tr>
<td>CESTA Directed Elective</td>
<td>3</td>
</tr>
<tr>
<td>Free Elective</td>
<td>3</td>
</tr>
<tr>
<td>Major Directed Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours: 120

Approved Computer Applications Elective: 3
Add. communications elective, approved ENC or SPH: 3
General Education Approved Natural Science Courses (2): 8

International Agriculture and Business

The International Agriculture and Business (IAB) Degree is an interdisciplinary and international program, designed to equip students with technical skills in various disciplines of agriculture, as well as the business skills necessary to function as competent agriculture professionals in a global economy. In addition to taking prescribed core courses in Agriculture and...
with laboratory demonstration. Relationship of these methods to "future foods". By permission only.

FOS 5315 Advanced Food Chemistry (3) Prereq: FOS 4311. In this class the focus of discussion will be the chemical composition of foods as related to food properties and function. Reaction mechanisms, interrelationships, and chemical processes affecting food quality from raw to processed states. By permission only.

FOS 5325 Advanced Food Analysis (3) Prereq: FOS 4321C. Advanced application of physical and chemical analytical methods for the quantitative determination of various food constituents and additives. Fundamental concepts underlying food analysis and comparison and justification of research methodologies. By permission only.

FOS 5906 Directed Individual Study (1-6) Individual study or research in food science under the supervision of faculty member. By permission only.

FOS 5930 Seminars in Food Science (1) Discussion of high priority food research areas which includes extensive library research, critical evaluation and class presentation. By permission only.

FOS 5940 Practical Food Experience (3) Supervised attachments at various food institutions in the research areas primarily. Student gets an exposure to equipment, methodologies and production principles. By permission only.

FRC 5805C Viticulture (4) Introduces the students to the art and science of grape growing. The history of grape production and utilization, is discussed with emphasis on North American and Florida grapes. A comprehensive survey of modern grape production practices is augmented with discussions of grapevine development, morphology and physiology of flowering and fruit maturation. Field experience in vineyard management will be provided. By permission only.

FRC 5808C Enology (4) Introduces the student to the origin and practices of enology, yeast fermentations and fruit processing. The course includes discussions on the chemistry of fermentation reactions, compositional evaluations, utilization and preservation of fermented beverages. Principles and products as related to grape cultivars used, and vilification technology employed. Use of Southeastern grapes is highlighted. By permission only.

HUN 5249 Advanced Human Nutrition (3) Prereq: HUN 2401 or FOS 3042. Topical issues in human nutrition research and relationships to food science.

PMA 5407C Integrated Pest Management (3) Prereq: General Entomology. An introduction to integrated pest management (IPM) dealing with theoretical and applied aspects of modern pest control strategies. The course consists of lectures and is divided into four sections. History of pest control and philosophy of IPM, modern pest control strategies, case histories of IPM programs. By permission only.

SWS 5217 Soil and the Environment (3) Prereq: Undergraduate physical sciences, mathematics, and basic soil sciences. Interpretation of soil chemical, physical, morphological and biological properties; information extraction from published soil survey data; laboratory analyses and testing of soils; soil classification and engineering applications; agricultural land classifications; soils and water conservation; and sustainable agroecosystems.


SWS 5405C Soil Chemistry (3) Prereq: General Chemistry, General Soils. The inorganic and organic constituents of soils. The chemical and physical properties of soil colloids, ions exchange, soil absorption and electrochemical phenomena in soil. By permission only. Grant Universities with established entomology programs, and Florida A&M University is the only Historically Black Land-Grant University that offers a B.S. and M.S. degree in entomology. Cooperation between the two Universities in developing this innovative minority program represents a historic achievement in the profession of entomology and a landmark in higher education for both Universities. The cooperative Ph.D. in entomology has received strong support from a number of state and national societies, government agencies and industrial leaders.

Professors at Florida A&M University offer a broad spectrum of aquatic, agricultural, medical and veterinary entomology courses in Tallahassee and the research laboratories on the main campus and at the John A. Mulrennan, Sr. Arthropod Research Laboratory in Panama City are available for thesis research. A Ph.D. student can take course work both universities depending on their interests and their major professor can be any regular faculty member at either university.

As this degree is directed towards African-Americans, women, and other minorities, each Ph.D. curriculum will be designed to meet the specific needs of each student. Scholarships and assistantships are available.

The graduate admission requirements for the cooperative Ph.D. in entomology are:

1. The student shall have earned a graduate degree from an accredited institution or shall have earned a 3.0 GPA or better in all work attempted while registered as an upper division student working for a baccalaureate degree.

2. The student shall have a total Quantitative-Verbal Graduate Record Examination (GRE) score of 1,000 or higher or an equivalent score on an equivalent measure approved by the Board of Regents. All applicants to graduate programs in the State of Florida must submit a GRE score even if the GRE has been waived.

3. International students whose native language is not English shall score 550 or better on the Test of English as a Foreign Language (TOEFL).

4. The student shall request three letters of recommendation from individuals in a position to evaluate the student as a potential graduate student.

5. The student shall provide a personal and professional goal statement. This is one page statement relating to the student's background, training, experience and proposed educational goals.

6. The student shall submit transcripts from all institutions of higher learning attended.

7. The student must have a major professor prior to being admitted for graduate studies.

A minimum of 90 semester credits beyond the B.S. degree is required to obtain the cooperative Ph.D. degree. A maximum of 30 graduate credits may be transferred into a cooperative Ph.D. program from other universities.

If a minor is taken, at least 12 credits in the minor subject are required, all of which must be courses 5000 and above. If two minors are taken, at least eight credits in each are required.

It is policy that all cooperative Ph.D. students will take statistics through at least a beginning graduate course (STA 6166 or equivalent) and at least a beginning biochemistry course at the undergraduate level. Doctoral students will be held responsible for a broad range of basic knowledge in their discipline. The qualifying examination includes questions on morphology, physiology, taxonomy, ecology and applied entomology.

Further information can be obtained from the Coordinator for the Cooperative Ph.D. in Entomology, Florida A&M University, Tallahassee, Florida 32307, Telephone (850) 599-8725, Fax (850) 599-8864.

Course Descriptions

ENY 6135 Taxonomy of the Major Orders of Holometabolous (4) Prereq: General Entomology. Identification of families of orders Coleoptera, diptera, Hymenoptera, and Lepidoptera; field trapping techniques, and common holometabolous families in North Florid ecosystems.

ENY 6166 Principles of Animal Taxonomy (3) Prereq: General Entomology or Biology. Principles involved in taxonomy and classification of animals; modern systematic techniques.

ENY 6215 Biological Control of Weeds (3) Prereq: General Entomology. Principles of biological control of weeds. Examples of terrestrial and aquatic weeds currently being treated or under study for treatment.

Doctor of Philosophy in Entomology (in cooperation with the University of Florida)

Florida is unique as it is the only state having 1862 and 1890 Land-