

# URBAN *and* FORESTRY

## NATURAL RESOURCES



**College of Agricultural, Family and  
Consumer Sciences**

**Master of Science in Urban Forestry**

## COLLEGE OF AGRICULTURAL, FAMILY AND CONSUMER SCIENCES

Interim Chancellor-Dean: Dr. Kalvin Walker

### Department of Urban Forestry

### Master of Science in Urban Forestry

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### FACULTY

#### **Professor:**

#### **Abdollahi, Kamran K.**

Ph.D., Forestry/Ecophysiology  
S. F. Austin State University

#### **Ghebreiyessus, Yemane**

Ph.D., Soil Sciences  
University of Missouri

#### **Ning, Zhu H.**

Ph.D., Forestry/Tree Physiology & Anatomy  
S.F. Austin State University

#### **Qi, Yadong**

Ph.D., Forestry/Ecology & Silviculture  
S.F. Austin State University

#### **Associate Professor:**

#### **Twumasi, Yaw**

Ph.D., Plant & Soil Science/GIS & Remote Sensing  
Alabama A&M University

#### **Assistant Professor:**

#### **Chappell, Christopher**

Ph.D., Urban Forestry/Management  
Southern University and A&M College

#### **Ferchaud, Vanessa**

Ph.D., Urban Forestry/Ecology and Tree Biology  
Southern University and A&M College

#### **Manrique, Veronica**

Ph.D., Entomology/Invasive Species & Biological Control  
University of Florida

### **Introduction**

The Urban Forestry Master of Science Graduate Program was established in the fall of 1998. The mission of the graduate program is to provide graduate students with a curriculum that offers sound academic training and experiential learning activities for professional career positions in governmental agencies, research organizations, and private firms. The program utilizes an interdisciplinary, total quality management approach to train students so that they can ultimately address critical issues and concerns in the science and management of urban forestry and natural resources. Each student will follow a prescribed program of course work and conduct a thesis research or capstone project tailored toward emerging issues or problems in urban forestry.

The overall objectives of the program in urban forestry are:

- ✓ To develop student's ability to synthesize relevant knowledge and skills in urban forestry and related disciplines for sound urban forestry practices.
- ✓ To extend advanced training in urban forestry to high school teachers for the advancement of the art and science of urban forestry and natural resources.
- ✓ To provide the latest technology and training to tree care professionals in order to preserve and protect the urban environment.
- ✓ To academically prepare students for study at the doctoral level at various universities in the nation.
- ✓ To initiate and sustain collaborative efforts with various governmental, public and private and organizations to address issues and concerns in urban forestry and to promote urban forest health and natural resource conservation.
- ✓ To conduct research aimed at addressing natural resource issues in urban environment.

### **Mission of the Department of Urban Forestry and Natural Resources**

The mission of the Department of Urban Forestry and Natural Resources is to advance our 1890 land-grant university's mission by providing high quality education and learning experiences to diverse undergraduate and graduate students, professional urban foresters, and the general public, and generating and applying new knowledge concerning the management of urban and community forestry and natural resources through Education, Research, and Service.

The Department is recognized at the state and national levels as a leader in the education of highly-qualified professional urban foresters. The central theme of our instruction is that urban forests are essential to society, and their scientific management is necessary to ensure a sustainable flow of commodity and non-commodity benefits from urban forest ecosystems.

The faculty is composed of a body of nationally and internationally recognized professional educators and scientists in forestry supported by other multidisciplinary professional scientists uniquely qualified to integrate knowledge from the natural, physical, and social sciences. All the basic sciences are holistically applied to the diagnosis of urban forest ecosystem problems and the prescription of management to assure the continued flow of products and other benefits from forest ecosystems for citizens of the State of Louisiana and the nation.

The Department achieves its mission through the provision of classroom instruction, outreach activities, and the production and dissemination of research results. Most aspects of the profession are covered in the undergraduate and graduate levels. The Department's

vigorous research program ensures that our students are on the cutting edge of forest science, keeps our faculty current within their various specialties, and assures that Louisiana Urban Forest residents and stakeholders and beyond receive the most current scientific information on urban forest management, urban-rural interface ecosystems, urban forestry and arboricultural industries, and attendant social, environmental, and economic issues.

Our responsibilities extend beyond the campus to the delivery of information to the various publics within the state and nation and parts of the world through outreach activities such as adult education, group advisory programs, applied research and demonstration projects, scientific forums, and other modes of continuing education. Furthermore, our faculty plays various major roles in professional and scientific societies and associations at the state, national, and international levels.

We envision a future in which growing population leads to fragmented forests and increased problems associated with the agricultural and urban-forest interface, in which the quality and quantity of water resources become increasingly important, and in which rising incomes place pressure on the forests to provide an increasingly broad array of non-traditional forest benefits, in addition to considerable increases in the demand for ecosystem services.

Accordingly, our graduates must possess a professional ethic that recognizes urban forestry objectives ranging from single use to multiple use and the host of demands placed on urban forests.

Progress towards these goals is constantly measured using indicators such as enrollment, employment of graduates, internal and external program evaluations and accreditation reviews, research and scientific stature, and the quality and performance of our graduates in their professional careers.

### Strategic Goals

Goal 1. Strengthen our commitment to producing high-quality urban forestry graduates responsive to the needs of employers and broad societal needs.

Goal 2. Enhance the Program as the center for urban forestry-related ecosystem science education in the university.

Goal 3. Strengthen our commitment to graduate education by producing high-quality Masters of Science and Doctors of Philosophy in Urban Forestry who will make significant contributions to forest science and the urban forestry and arboriculture profession.

Goal 4. Strengthen our commitment to a strong, needs-based research program for urban forest science and sustainable urban forest ecosystem.

Goal 5. Strengthen our commitment to a dynamic and comprehensive outreach/extension program that successfully meets the needs of the citizenry and enhances the department's reputation and credibility throughout the State of Louisiana, the region, the nation, and beyond.

Goal 6. Strengthen the staffing, support, facilities, and administrative systems that will increase the efficiency and effectiveness of our department's operations.

## GRADUATE DEGREE OFFERED

### M. S. Master of Science in Urban Forestry

(Thesis and Non-Thesis options)

## ADMISSION REQUIREMENTS

In addition to the general requirements of the Graduate School, to be considered for admission to the M. S. degree program in urban forestry, prospective students must meet the following criteria:

A baccalaureate degree from any accredited four-year institution in urban forestry, forestry, renewable and natural resources, plant and soil sciences, biology, chemistry, natural and environmental sciences. Applicants with baccalaureate degrees in other disciplines may be admitted with conditions.

Must have a minimum overall grade point average (GPA) of 2.7 on a 4.0 scale for all undergraduate work.

Must take the Graduate Record Examination (GRE). A minimal score of 1250 calculated from the GPA multiplied by 200 and added to the GRE combined verbal and quantitative scores.

Must submit a curriculum vitae/resume.

Must submit a concise essay on research background and career goals.

Must submit three written letters of recommendation, two of which must be from advisors in student major field.

The student must remove conditional status by earning at least a B (3.0) average in the first nine hours of graduate courses; failure to achieve this average will result in withdrawal from the program.

Students found to be deficient in urban forestry or related fields must take 9 to 12 hours of remedial courses from the following listed urban forestry courses plus any other urban forestry undergraduate core courses as deemed necessary and recommended by the major advisor and graduate committee.

Intro to Urban Forestry (UFOR 151)  
Urban Dendrology (UFOR 278)  
Urban Soil and Environment (UFOR 251)  
Urban Forest Ecology (UFOR 391)  
Urban Forestry Management (UFOR 455)  
Tree Physiology (UFOR 438)

## DEGREE REQUIREMENT

### Master of Science in Urban Forestry

In addition to the general requirements of the Graduate School, under the thesis option, a minimum of 30 semester credit hours (a minimum of 24 credit hours of graduate course work and a minimum of 6 credits of thesis) are required plus a completed thesis approved by the graduate committee. Under the non-thesis option, a minimum of 36 semester credit hours (a minimum of 30 credit hours of graduate course work and a minimum of 6 credits for a capstone project and supervised research) are required plus a completed capstone project report approved by the graduate committee and passing of the final comprehensive exam for the non-thesis option.

- Earn a minimum cumulative Grade Point Average of 3.0 on all graduate course work, and all course work applied specifically to the degree.
- Only two "C" grades are permissible towards a degree program and NO GRADE OF "D" COUNTS TOWARDS A DEGREE PROGRAM.
- The "C" grade must not be in the required courses.

**PLAN OF STUDY**

**Masters of Science in Urban Forestry**

**Number of Credit Hours - Thesis Option Graduation Requirements**

**Core Courses:**

UFOR 514	Experimental Statistics and Design.....	3 credits
UFOR 523	Tree Growth and Development.....	3 credits
UFOR 532	Nutrition of Urban Trees.....	3 credits
UFOR 535	Global Change and Environ. Consequences...	3 credits
UFOR 537	Agricultural Biosecurity .....	3 credits
UFOR 540	Urban Forest Ecophysiology.....	3 credits
UFOR 553	Advanced Urban Forest Management .....	3 credits
UFOR 562	Applications of Integrated GIS/GPS in Urban Forestry.....	3 credits
UFOR 600	Thesis Research.....	6 credits

Thesis Defense and Thesis

**Total 30 credits**

**Number of Credit Hours - Non-Thesis Option Graduation Requirements**

**Core Courses:**

UFOR 514	Experimental Statistics and Design.....	3 credits
UFOR 523	Tree Growth and Development.....	3 credits
UFOR 532	Nutrition of Urban Trees.....	3 credits
UFOR 535	Global Change and Environ. Consequences...	3 credits
UFOR 537	Agricultural Biosecurity .....	3 credits
UFOR 540	Urban Forest Ecophysiology.....	3 credits
UFOR 553	Advanced Urban Forest Management .....	3 credits
UFOR 562	Applications of Integrated GIS/GPS in UFOR...	3 credits
Area of Emphasis UFOR Electives.....		6 credits

UFOR 598 Capstone Project..... 3 credits

UFOR 599 Supervised Research..... 3 credits

Capstone Project Report and Final Comprehensive Exam

**Total 36 credits**

**Electives**

UFOR 500	Environmental Horticulture.....	3 credits
UFOR 501	Research Problem in Urban Forestry .....	3 credits
UFOR 502	Special Topics in Urban Forestry.....	3 credits
UFOR 503	Urban Tree Law .....	3 credits
UFOR 505	Plant Tissue Culture .....	3 credits
UFOR 518	Agro-Forestry and Sustainable Systems.....	3 credits
UFOR 520	Ecosystem Analysis.....	3 credits
UFOR 528	Plant-Air Pollution .....	3 credits
UFOR 542	Urban Soil and Water Conservation .....	3 credits
UFOR 545	Environmental Soil Chemistry & Properties....	3 credits
UFOR 555	Restoration Ecology .....	3 credits

UFOR 559	Methods in Environmental Impact Assessment	3 credits
UFOR 560	Urban Forest Economics .....	3 credits
UFOR 561	Tree Biomechanics.....	3 credits
UFOR 570	Urban Water Resource Management .....	3 credits

**Time Limitations (Statute of Limitations for Master Degree)**

At the time of graduation, the student must NOT have any courses applied toward master degree which exceed the statute of limitations (7 years for master degree).

**COURSE DESCRIPTIONS**

**UFOR 500. ENVIRONMENTAL HORTICULTURE (3 credit hours: 2 hrs lecture, 2 hrs lab).** Scientific and practical approaches of horticulture in urban environments.

**UFOR 501. RESEARCH PROBLEMS IN URBAN FORESTRY (3 credit hours).** Individual projects and group discussions concerning current research issues in urban forestry. Students will review relevant literature and develop research prospectus on selected topics of individual interest.

**UFOR 502. SPECIAL TOPICS IN URBAN FORESTRY (3 credit hours).** Applications of ecological, social, economic theories to problems of managing urban forest ecosystems. Students will examine topics of individual interest related to the planning and management of urban forests uses and benefits.

**UFOR 503. URBAN TREE LAW (3 credit hours: 3 hrs lecture).** General features of the constitutional, statutory and administrative laws, institutions and processes which establish or limit the powers of public managers. Development of practical student competencies in legal reasoning and research on trees in urban areas.

**UFOR 505. PLANT TISSUE CULTURE (4 credit hours: 2 hrs lecture, 2 hrs lab).** Theoretical and practical aspects of isolation culture of higher plant cells, tissues and organs.

**UFOR 514. EXPERIMENTAL STATISTICS AND DESIGN. (3 credit hours: 2 hrs lecture, 2 hrs lab).** An overview of the conceptual and methodological bases of urban forestry research design, data analysis, and interpretation. Case studies and individual research projects critiqued.

**UFOR 518. AGRO-FORESTRY AND SUSTAINABLE SYSTEMS. (3 credit hours: 3 hrs lecture).** Principles and techniques of agro-forestry and sustainable systems. Special emphasis will be placed on establishment, cultural and management practices.

**UFOR 520. ECOSYSTEM ANALYSIS (3 credit hours: 2 hrs lecture, 2 hrs lab).** Analysis of ecological dynamics of various ecosystems including urban, terrestrial and aquatic ecosystems. Analysis includes physical, chemical and biological properties, energy balance, biogeochemical cycles and their interrelationships.

**UFOR 523. TREE GROWTH AND DEVELOPMENT (3 credit hours: 2 hrs lecture, 2 hrs lab).** The study of tree constituents, their occurrence, transformation and metabolism and their changes influenced by the environments. Major emphasis will be placed on effects of urban environmental factors.

**UFOR 528. PLANT-AIR POLLUTION (3 credit hours: 2 hrs lecture, 2 hrs lab).** Study of the interactions between plants and major air pollutants such as O<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, and particulate pollutants. This course addresses the role of urban vegetation in removing gaseous pollutants. Physiological, morphological, and anatomical responses of plants are discussed. Laboratory works involve measurement of gaseous

fluxes, quantification of pollutant removal by individual species of plants and more. Specific projects are designed for students to provide experiential learning and research opportunities.

**UFOR 532. NUTRITION OF URBAN TREES (3 credit hours: 3 hrs lecture).** Nutrient requirements of urban plants and the functions of these nutrient elements in their adaptation under urban stressful environment.

**UFOR 535. GLOBAL CHANGE AND ENVIRONMENTAL CONSEQUENCES (3 credit hours: 2 hours lecture, 2 hrs lab).** The concepts and concerns regarding global effects of a continued increase in atmospheric greenhouse gases and the consequences on earth systems as well as urban forestry ecosystems.

**UFOR 537. AGRICULTURAL BIOSECURITY (3 credit hrs).** This course will cover the principles and practices for the identification, containment, and control of non-native organisms that are threatening agriculture and the environment in the USA. The concepts of invasion ecology including the steps during an invasion will provide an ecological background on the topic. Biosecurity related to trade and border control, phytosanitary treatments, and surveillance methods will be discussed. Pest risk analyses will be used as predictive methods to categorize risky species. Several case studies of invasive insects, plants, and pathogens related to plant biosecurity will be presented.

**UFOR 540. URBAN FOREST ECOPHYSIOLOGY (3 credit hrs: 2 hrs lecture, 2 hrs Lab).** Evaluation of the effects of various environmental factors on the whole plant physiological processes in urban environments. Subjects including the physiological background, causes and consequences of ecological process, especially those related to the atmosphere and climatic changes in the past, present, and future.

**UFOR 542. URBAN SOIL AND WATER CONSERVATION (3 credit hours: 2 hrs lecture, 2 hrs Lab).** Urban soil and water conservation deals with management of soil and water degradation processes (e.g. soil erosion), soil loss prediction models and sustainable/conservation methods in the urban and sub-urban areas. Soil and water are the most critical natural resources that affect sustainability of agricultural, forest, recreational and disturbed urban soil ecosystems. These resources have great impact in the mitigation to climate change and on the quality of life in the urban environment.

**UFOR 545. ENVIRONMENTAL SOIL CHEMISTRY AND PROPERTIES (3 credit hours: 2 hrs lecture, 2 hrs lab).** Soil chemical reactions on plant growth, environmental aspects of soil chemical reactions, fate of pollutants in the soil and remediation of contaminated soils.

**UFOR 553. ADVANCED URBAN AND COMMUNITY FOREST MANAGEMENT (3 credit hours: 3 hrs lecture).** Application of systems and principles of management of urban ecosystems; issues and methodology for integrating biological, social, legal, and economic aspects of ecosystem studies.

**UFOR 555. RESTORATION ECOLOGY (3 credit hours: 2 hrs lecture, 2 hrs lab).** Application of ecological knowledge in repairing

and restoring damaged ecosystems. Major emphasis will be placed on urban ecosystems.

**UFOR 559. METHODS IN ENVIRONMENTAL IMPACT ASSESSMENT (3 credit hours: 2 hrs lecture, 2 hrs lab).** Principles of environmental analysis, preparation of environmental impact statement, sampling of aquatic and terrestrial plants and animals and ecological issues in urban ecosystems in the South.

**UFOR 560. URBAN FOREST ECONOMICS (3 credit hours: 3 hour lecture).** Principles and methods of urban economics. Analysis of the role of urban forests on investment, commercial, industrial, and business opportunities in urban areas. (To be jointly offered by Agricultural Economics and Urban Forestry faculty.)

**UFOR 561. TREE BIOMECHANICS (3 credit hours: 2 hrs lecture, 2 hrs lab).** Principles of tree stress physiology. Major emphasis will be placed on factors attributing to the structural failure of the tree resulting from environmental manifestations. Tree failure analysis and other diagnostic measures with reference to tree forms will be covered.

**UFOR 562. APPLICATION OF INTEGRATED GIS/GPS IN URBAN FORESTRY (3 credit hours: 1 hour lecture, 4 hrs lab).** A survey of current research and issues in GIS, GPS and related fields. Analysis of the practical applications of integrated GIS/GPS. Practice in the use of GIS/GPS systems in the urban forest environment.

**UFOR 570. URBAN WATER RESOURCE MANAGEMENT (4 credit hours: 2 hrs lecture, 2 hrs lab).** Qualitative understanding of hydrological processes in the urban areas and methods for quantifying hydrologic parameters and processes associated with these environmental systems. (Prerequisite: UFOR 271 or consent of the instructor.)

**UFOR 598. CAPSTONE PROJECT (3 credit hours: Individual time. Pass/Fail grade).** A special project of the student's interest in urban forestry and related areas to be pursued as a partial requirement toward the M.S. degree by non-thesis majors.

**UFOR 599. SUPERVISED RESEARCH (3-12 credit hours: Pass/Fail grade).** Research, under the guidance of the graduate faculty member, for Master's students before registration of thesis proposal and/or registration for Master's thesis. Designed for students who have been accepted into the master's degree program and have satisfied the basic skill and knowledge requirements in urban forestry. Not open to students who have not been admitted into and/or enrolled in the graduate degree program.

**UFOR 600. THESIS RESEARCH (1-9 credit hours: Pass/Fail grade).** Research for and writing of Master's thesis.