Urban Tree Care (Arboriculture) Syllabus
HORT (FOR) 4270   3 credit hours
Spring 2020

Instructor
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Office hours: By appointment. Schedule a meeting either in person, email, or by phone. Please see me if you have any questions, concerns, or need any assistance. My work often keeps me out of my office, so if you cannot locate me, please leave me a message on my phone, on my office door, or with Ms. Tracy Reynolds, Administrative Assistant, Room 171 P & A Building.

COURSE INFORMATION

MEETING TIME

This class meets every Tuesday and Thursday from 11:00 a.m. to 12:15 p.m. in E-147 Poole Agricultural Center.

SYNOPSIS

This course provides students with an overview of the field of arboriculture (*ARE-bur-kul-cher*), and is structured to help you become familiar with the principles and professional practices of this field. Students will be introduced to the science, technology, and art of selecting, establishing, managing, and conserving trees in the built environment. Tree responses to urbanization will also be studied. The instructor will emphasize the sustainable, ethical stewardship of landscape/streetscape trees for the benefit of people and the environment.

Arboriculture and urban forestry are two terms commonly associated with the care of urban trees. **Arboriculture** (`r-bur-kul-cher) is the art, science, and technology of selecting, establishing, and maintaining landscape/street trees in the built environment.

Urban forestry is the management of planted and naturally occurring vegetation in urbanized areas to improve and sustain the urban environment.

While the two fields overlap one another, as a general rule, arborists are professionals who evaluate and treat trees on an individual basis, while urban foresters deal more often with larger-scale urban ecosystem management issues.

Community forestry is the combination of planning, establishment, management, and research of trees and associated plants (individually, in groups, or under forest conditions) within cities, suburbs, and towns. Community forestry addresses the interface between people, the built environment and trees through a dynamic interaction of forestry, horticulture, arboriculture, landscape architecture, and urban planning. As cities continue to grow, increasing numbers of people will choose to live, work, and play in community forests, making the field of community forestry critical for healthy and sustainable living.

ABOUT YOUR INSTRUCTOR

Before coming to Clemson in July 1990 (B.S., Plant Science, Rutgers University; M.S., Horticulture—Pomology, Virginia Tech), I was a Virginia Cooperative Extension Service agent in Fairfax County, Virginia. My primary responsibility was commercial and residential turf, but I was involved in many other projects that included managing a plant diagnostic clinic staffed by Master Gardeners and conducting educational programs for arborists, garden center/nursery operators, and landscape managers.

At Clemson University, I served as State Coordinator of the Master Gardener program from 1990 to 2006 and Extension Consumer Horticulture specialist. For more than a quarter of a century, I have educated commercial and consumer audiences on a wide range of topics in a variety of media that include radio, TV, and the internet. I published my research in peer-reviewed scientific journals and authored a variety of commercial-/consumer-oriented articles in print and digital magazines. For 13 years I was the "Questions & Answers" columnist for *Horticulture* magazine. I was a contributing writer for two nationally distributed gardening books and a technical editor of 12 gardening books. I also authored four regional gardening books. Since 1992 I earned 35 awards for my written publications, radio, and TV programs.

A mid-life crisis affected me in 2003 when I decided to go back to school to earn a doctorate. Since earning my Ph.D. in Plant & Environmental Science in 2009, I teach *Landscape Plants* in the Fall and *Urban Tree Care* and *Selected Topics in Urban Forestry* in the Spring. Since Sept. 2011 I have been the advisor for the Urban Forestry minor, advise undergraduates, and serve on graduate committees. My horticultural/arboricultural pursuits include the study of urban tree growth and management and identifying, evaluating, and promoting noteworthy woody species for landscape and street tree applications.

COURSE OBJECTIVES

The main objectives for this course are for you to
- know the benefits and costs of trees in the built environment.
- know the above- and below-ground tree structures—their morphology, anatomy, and physiology.
- know urban soil definitions, soil management, and remediating soil problems.
- know various techniques for altering infrastructure to improve soil volume and tree longevity.
- discuss fertilizer objectives and techniques, mineral and water absorption.

- describe the various components of nursery tree production and the availability.
- define and describe pruning techniques.
- explain how to preserve and protect trees from construction activities.
- list and describe a variety of abiotic (nonliving) and biotic (living) disorders that affect tree performance.
- explain how to conduct tree risk assessments to know the terminology associated with at-risk trees.
- demonstrate the ability to paraphrase, summarize and explain findings from peer-reviewed, primary scientific research papers.
- support or refute an arboricultural practices using the evidence-based approach.
- develop a tree management plan for a commercial or residential client.

STUDENT LEARNING OUTCOMES

Each of you will use the information from this course differently during your professional careers. Some of you will become certified arborists, practicing these skills yourself or just as likely, to manage other tree care professionals. Some will hire and/or supervise contracted tree care crews on job sites. Some of you may consult and educate clients about urban tree care. Others may serve on planning commissions, tree boards, and zoning boards.

Regardless of your professional future, this course will provide you with the tools to communicate effectively, argue persuasively, solve problems creatively, and think critically. You will also acquire basic knowledge and skills that will enable you to:
- explain the benefits and challenges of trees in the urban environment.
- describe the growth and development of trees as it relates to tree health and performance.
- explain the biological responses of trees to arboricultural practices.
- identify abiotic and biotic stressors in the urban environment and predict tree growth responses.
- recommend soil management practices and techniques that maximize soil volume in urban environments.
- write specifications for quality tree selection, planting, and establishment.
- recommend and recognize sound pruning and training practices.
- recognize potential conflicts (construction, utilities, turfgrass, etc.) involving trees.
- apply arboricultural principles and professional practices to address problems with site conditions, tree selection, and management protocols.
- assess the condition of a tree in terms of general health and for potential risk of failure.
- locate scientific, professional and/or trade references and use them effectively in developing educational materials.
- discuss the supporting science for recommended arboricultural practices.
- discuss career opportunities, trends and issues in arboriculture.

If you expect to achieve these learning outcomes, it will be expected that you invest at least 9 hours/week on this class, according to the "Definition of "Credit Hour"—the Carnegie Unit: how to calculate student contact hours", a unit of credit equates to 3 hrs. of student work/week. Accounting for 2 hrs. 30 min. of lecture, you may have to invest an additional 6 hrs. 30 min. of work/week.

Required textbook and important web site:

- Lilly, S. J. 2010. *Arborists' Certification Study Guide*. International Society of Arboriculture, Champaign, IL. [Two copies on reserve at the Cooper Library.]
- *Landscape Plants, Univ. of FL.* Dr. Ed Gilman's site is the definitive online resource for arboricultural and horticultural information

Readings will be assigned from the textbook and from a variety of up-to-date resources as listed in the "Study Guides & Readings" for each lecture topic. These readings will include book chapters, web sites, and peer-reviewed scientific papers. They will be available in print and digital formats as class handouts, via Canvas® (Modules), reserved copies at the Cooper Library, and/or on the web. Powerpoint lectures will be made available in Modules.
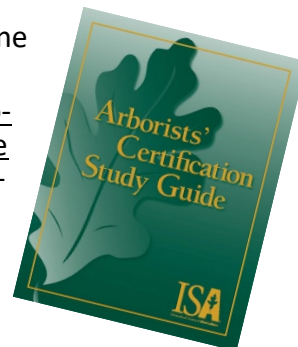
Other Reserved Materials at the Cooper Library:

- Dirr, M. A. and K. S. Warren. 2019. *The tree book: Superior selections for landscapes, streetscapes, and gardens*. Timber Press, Inc.
  eBook access: http://libcat.clemson.edu/record=b4029004~S1
- Harris, R. W., J. R. Clark, and N. P. Matheny. 2004. *Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines*. 4th ed. Prentice Hall.
- Gilman, E. F. 1997. *Trees for Urban and Suburban Landscapes*. Delmar, Clifton Park, NY.
- Gilman, E. F. 2012. *An Illustrated Guide to Pruning*, 3rd ed. Delmar, Clifton Park, NY.
- Matheny, N. P. and J. R. Clark. 2008. *Municipal Specialist Certification Study Guide*.
- International Society of Arboriculture, Champaign, IL.
- Urban, J. 2008. *Up by Roots; Healthy Soils and Trees in the Built Environment*. International Society of Arboriculture. Champaign, IL.
- *Best Management Practices: Soil Management for Urban Trees*
- *BMPs: Tree Planting*, 2nd ed.
- *BMPs: Tree Pruning*, 3rd ed.
- *BMPs: Integrated Pest Management*, 2nd ed.

Other materials of interest to arboricultural and allied professionals:

Books

Dirr, M. A. and K. S. Warren. 2019. *The tree book: Superior selections for landscapes, streetscapes, and gardens*. Timber Press, Inc.

Francesco Ferrini, F., C. C. Konijnendijk van den Bosch, and A. Fini. 2017. Routledge *Handbook of urban forestry*. Routledge, NY.

Hirons, A. and P. A. Thomas. *Applied tree biology*. 1st ed. 2018. John Wiley & Sons, Inc., Hoboken, NJ.

Shigo, A. L. 1991. *Modern arboriculture: a systems approach to the care of trees and their associates*. Shigo and Trees, Durham, NH.

Towbridge, P. J. and N. L. Bassuk. 2004. *Trees in the Urban Landscape: Site Assessment, Design, and Installation*. John Wiley, Hoboken, N.J.

Watson, G. W. and E. B. Himelick. 2013. *The practical science of planting trees.* International Society of Arboriculture, Champaign, IL (www.isa-arbor.com).

Trade journals

American Forests, *Arbor Age*, *Arborist News*, *City Trees*, and *Tree Care Industry Magazine*.

<div align="center">Scientific peer-reviewed journals</div>

Journal of Arboriculture, Arboriculture & Urban Forestry, Urban Forestry & Urban Greening, HortScience, HortTechnology, and *Journal of Environmental Horticulture*.

<div align="center">Web sites</div>

- *Alliance for Community Trees*
- *American Society of Consulting Arborists*
- *Arbor Day Foundation*
- *International Society of Arboriculture*
- *I-Tree*
- *Society of Municipal Arborists (*visit (http://read.dmtmag.com/i/94460) for current and archived issues of *City Trees*, the online magazine of the Society of Municipal Arborists
- *South Carolina Forestry Commission Tree Care & Community Forestry*
- *Tree Care Industry Association*
- *Trees for Energy Conservation*
- *TREE Fund webinars*
- *Urban Forestry Webinars in 2018*
- *Urban Forest Connections Webinar Series*
- *U.S. Forest Service: Caring for the land and serving people*
- *Vibrant Cities Lab*: partnership among the US Forest Service, American Forests, and the National Assoc. of Regional Councils to help city managers, policymakers, and advocates build thriving urban forest programs.

COURSE GRADING

GRADING		
Assessment	Weight	Deadline
Lecture Assignments: include, but are not limited to, participation, in-class/at home assignments, quizzes (lowest quiz dropped), and oral presentations.	30%	Jan 16-April 23
Exam #1	10%	Feb 13
Exam #2	10%	March 31
Bartlett Tree Research Laboratories field trip and reflection paper	10%	April 16
Final Exam (cumulative)	12%	April 29
Projects and Presentations[1]	28%	
i-Tree Design iTree—paper due Feb. 6; presentations Feb. 6-20.		
Tree management plan (TMP) and presentation TMP paper due on or before April 7. Site approval required. Site approval required. TMP presentations April 7-23.		

Grades (% mastery of course content):
A = 90.00-100%; B= 80.00-89.99%; C = 70.00-79.99%; D = 60.00-69.99%; F = 59.99% and below

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[1]See the Appendices for a brief explanation of the assignments and projects. See the Assignments folder in Canvas® for detailed instructions for Lecture Assignments and Projects..

Field Trip: Attendance on the field trip is required. On April 16 we will visit the Bartlett Tree Research Lab in Charlotte, North Carolina. We will be joined by students from Spartanburg Community College. If you miss and/or cannot attend the field trip due to an undocumented and unapproved medical/family excuse, it will result in a zero for 10% of your final grade for the course. An alternative to earning a 0 is to write an original 6,000 word paper (12 point font/double spaced with one-inch margins) on a topic of the instructor's choice. It must be submitted electronically on or before April 22 at 4:30 p.m. The paper will not be accepted after this deadline.

A student who can provide reasonable proof of a family or medical emergency can write a 3,000 word research-based literature review paper on a topic of the instructor's choice. The paper must be submitted electronically on or before April 12 at 4:30 p.m.

Important: Students are responsible for anything said in class including answered questions; also responsible for text assignments, handouts, major points on web site, and articles supplied by instructor. To get the most out of this course, review the class materials prior to the next class. Typed assignments must be submitted no later than the due date (usually right before the lecture). Grades for assignments turned in past the due date and time will be reduced by 10% for each late day for all deadlines. *Got computer problems? Reach out to CCIT if necessary (ithelp@clemson.edu [656-3494]).*

CLASSROOM POLICIES

1. Our class meets from Tuesday and Thursday from 11:00–12:15 p.m. in Room E-147 Poole. Please wait 15 minutes beyond the scheduled beginning of class for your instructor. If no one shows up by then, you may leave.
2. All cell/smartphones and similar electronic devices must be turned off while in the classroom. Do not use cellular devices until you have left the room. If there are extenuating circumstances, notify me before class so that we can set up an appropriate arrangement.
3. Grade protests for lecture exams will ONLY be accepted in writing within one week of the time that the exams are returned. Protests must be written in a professional manner, giving logical reasons for a potential grade adjustment.
4. Regular and punctual attendance of class is your responsibility, and you are responsible for all the work, including tests and written work, in all classes. The current University policy concerning class attendance is as follows:

Attendance Policy[2]

The academic resources of Clemson University are provided for the intellectual growth and development of students. Class attendance is critical to the educational process; therefore, students should attend scheduled courses regularly if they are to attain their academic goals.

In the event of an emergency, the student should make direct contact with the course instructor, preferably before a class or an exam takes place. Students should speak with their course instructors regarding any scheduled absence as soon as possible and develop a plan for any make-up work. It is the student's responsibility to secure documentation of emergencies, if required. A student with an excessive number of absences may be withdrawn at the discretion of the course instructor.

Course instructors must implement fair grading procedures and provide an opportunity to make up missed assignments and examinations that does not unfairly penalize the

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[2] Academic Regulations" in *2019-2020 Undergraduate Announcements*.

student when an excused absence is accepted. Such make-up work shall be at the same level of difficulty with the missed assignment or examination. Course instructors shall hold all students with excused absences to the same standard for making up missed assignments or examinations. While course instructors should seek to make reasonable accommodation for a student involved in University-sponsored activities, students should understand that not every course can accommodate absences and that absences do not lessen the need to meet all course objectives.

Absence from class is detrimental to the learning process, so course instructors may use reasonable academic penalties which reflect the importance of work missed because of unexcused absences. Course instructors who penalize students for unexcused absences must specify attendance requirements as related to grading in the course syllabus and must keep accurate attendance records. Course instructors are obligated to honor exceptions to the university attendance policy for students covered by the Americans with Disabilities Act, as verified through paperwork issued by Student Disability Services.

5. If you are absent from a class, it is your responsibility to get the materials you missed. Please get notes from other classmates, not the instructor. Work missed due to an unexcused absence, including quizzes and exams, will result in a grade of zero.

6. If you must miss a quiz or exam due to an emergency, you are expected to contact the instructor that day and, again, bring written documentation of the emergency. An acceptable documented medical excuse from your physician will need to include a statement confirming you were too ill to attend class. No exceptions will be considered.

7. If a student arrives late to lecture and a quiz has is in process of being take or has already been administered, the student will receive a 0 for that quiz. There are no makeups for quizzes due to tardiness.

8. If you miss an exam without an excuse, you will receive a zero (0) for the exam. For those with excused absences, at least one (1) week before the scheduled exam date you must arrange a mutually convenient day and time to take the make-up exam.

    a. Anticipated Absences: Students should use the Notification of Absence module in Canvas, or other reasonable means, to notify the course instructor of a future absence from class. This communication is only for information and does not verify the student's reason for absence or impact the course instructor's evaluation of the student's academic work. The student must make personal contact with the course instructor as soon as possible.
    If a student realizes in the first two weeks of classes that an anticipated number of absences will exceed the number of excused absences permitted in the course, the student should discuss the situation with the course instructor, the student's adviser, and/or the academic Associate Dean in the college in which the student is enrolled. A suitable resolution should be reached before the end of the second week of the semester.
    Students are encouraged to inform course instructors of known conflicts as soon as possible, but no later than one week before the date of any assignment, project, or exam.

    b. Unanticipated Absences: Students should use the Notification of Absence module in Canvas to notify the course instructor. This communication is only for information and does not verify the student's reason for absence or impact the course instructor's evaluation of the student's academic work. If the student is unable to contact course instructors, the student (or representative) should contact the Office of the Dean of Students, who will notify the course instructors of the circumstances, providing a liaison in cases limited by medical confidentiality.

    c. Excused Absences: A student may be excused from attending class in cases of emergency or other compelling reasons deemed appropriate by the course instructor. Excuses for emergency absences must be reported to the course instructor as soon as possible (for example, through e-mail), but not more than one week after the return to class. In certain cases, the Dean of Undergraduate Studies (or designee) may provide a letter verifying the student's absence as excused. Course instructors are expected to excuse absences for reasons including:

(1) A medical complication (pregnancy/childbirth-related, physical injury, illness, etc.) too severe or contagious for the student to attend class, when certified by an attending physician. Healthcare providers at Redfern Health Center do not provide written excuses; however, students should retain paperwork of medical visits affirming date and time. Whenever possible, students should visit Redfern as outpatients without missing class. An absence for a non-acute medical service does not constitute an excused absence. Course instructors may, at their discretion, require documentation of medical absences.

(2) Death, serious illness, or emergency in a student's immediate family (course instructors may require documentation).

(3) Participation in authorized University-sponsored activities, not to include practice for the activities. Course instructors may require documentation from the course instructors or staff advisor of the sponsored University group.

(4) Religious observances and practices which prevent the student from being present during a class period (prior consultation with the instructor is necessary).

(5) Participation in court-imposed legal proceedings (e.g., jury duty or subpoena).

(6) Required participation in military obligations as certified by the student's commanding officer.

(7) Interviews for jobs, co-op assignments, internships, graduate school, or professional school. Students should make every effort to schedule appointments around their class obligations and will provide documentation beforehand to verify a class conflict. In the event of a regional or national emergency (e.g., pandemic, hurricane, etc.), students missing classes may not be charged with unexcused absences if the nature and extent of the emergency is defined and disseminated by the Provost (or designee).

9. There will be no discussion of your academic performance in class. Make an appointment with your instructor to discuss your individual scores on quizzes, exams, and projects.

10. All work is expected to be completed individually and independently unless expressly permitted by the instructor. Any collaboration on quizzes and exams constitutes plagiarism or cheating. All text included in quizzes/projects that was written by someone else other than you must be correctly quoted and cited. All images included in assignments and projects must be identified to author/artist. If you are the creator of the image, please cite your name. See "Statement of Integrity" below.

STATEMENT OF INTEGRITY

"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."

Any breach in the Statement of Integrity is academic dishonesty. We may further define academic dishonesty as:

1. Giving, receiving, or using unauthorized aid on any academic work;
2. Plagiarism, which is defined as the copying of language, structure, or ideas of another and passing them off as one's own work. copying of someone else's words without acknowledgment;
3. Copying or unauthorized use of someone else's computer files, or account.

All academic work submitted for a grade must be your own from the present semester. Work that has been turned in for credit for a previous course will not be accepted. All text included in assignments that was written by someone other than the student must be correctly quoted and cited.

All academic work submitted for grading or to fulfill academic requirements contains an implicit pledge and may contain, at the request of an instructor, an explicit pledge by the student that no unauthorized aid has been received.

We will follow the "Academic Regulations" in the 2019-2020 Undergraduate Catalog. You should read and become familiar with this information. Among prohibited behaviors is the photography (digital or otherwise) or unauthorized copying of any answer key or exam that is not permanently returned to the student—ask permission before transcribing such items. Everyone is expected to follow the honor code. If you fail to return an exam that is not supposed to be permanently returned to the student, you will earn a 0 on that exam.

If you cheat on a lecture exam, quiz (in class or online), or on a lab quiz, you will earn a 0 on that assignment. If you cheat a second time on a lecture exam, quiz (in class or online), or on a lab quiz, you will be dismissed from the course and will be reported to the appropriate university authorities.

Everyone is expected to follow the honor code. Any student suspected of academic dishonesty will be reported to the appropriate university authorities. The penalty for academic dishonesty is automatic dismissal and a letter grade of F.

ACCESSIBILITY AND ACCOMMODATIONS

Student Accessibility Services coordinates the provision of accommodations for students with disabilities in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, as amended in 2008, Reasonable and specific accommodations are developed with each student based on current documentation from an appropriate licensed professional. All accommodations are individualized, flexible, and confidential based on the nature of the disability and the academic environment. Housing accommodations for a disability or medical condition are also coordinated through this office located in Suite 239 of the Academic Success Center. Students can call 864-656-6848 for an appointment or email:studentaccess@lists.clemson.edu for more information.

Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.

Whether or not you have documentation, I hope to make our learning experience as accessible as possible to everyone. Please let me know early in the semester if you have any concerns regarding your learning potential, participation, or general access in this course.

Title IX (Sexual Harassment) Statement: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972.

Ms. Alesia Smith is the Clemson University Title IX Coordinator and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).

This syllabus reflects expectations for the course; however, the instructor may find it necessary to make changes in the syllabus after the course begins. In such cases, students will be notified accordingly via email and Canvas® Announcements. Make sure you are receiving emails from the instructor. The most recent version will be posted in the "Syllabus" page in Canvas®.

I am committed to your success in this class and in your future careers. Please talk to me if you are having difficulty with class material or wish to discuss class concerns.

CUPD 2019-20 Safety and Security Reminders
Gregory G. Mullen | Associate Vice President for Public Safety | Chief of Police
I would like to highlight several important elements that can assist University public safety personnel in achieving their goal of enhancing safety, reducing risk and preventing harm. The foundation for a safe and secure campus is to have everyone engaged. Safety and security is everyone's responsibility and we need your help to make Clemson as safe as it can be.
Read more on how we can accomplish this together by following several basic principles.

This course is part of the Clemson Thinks^2 quality enhancement plan that involves critical thinking, a skill very vital for your success in college and after your graduation.

Robert F. Polomski 2020©

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The materials found in this online course are strictly for the use of students enrolled in this course and for purposes associated with this course; they may not be retained or further disseminated. Clemson students, faculty, and staff are expected to comply fully with institutional copyright policy as well as all other copyright laws.

Clemson University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (http://www.sacscoc.org/membershipInfo.asp; 1866 Southern Lane, Decatur, Georgia 30033- 4097; telephone number 404-679-4500).

2020 URBAN TREE CARE CLASS CALENDAR	
Lecture # ♦ Date	**Lecture Topic and Readings**
1 ♦ Jan 9 ♦ Thurs	▪ Introduction/orientation to "Urban Tree Care." Syllabus and class overview, expectations (instructor and students), activities, projects, exams, grading, readings, and study guides. ▪ Discuss arboricultural organizations; define industry standards—ANSI A300 standards, the generally accepted industry standards for tree care, best management practices, and specifications. FYI only: *The Landscape Architect in the Nursery: Tagging Trees and Enforcing Specifications*. James Urban, Urban Trees + Soils, and Paul Josey, Wolf Josey Landscape Architects (9/10/2019). ▪ When presented with the "Guiding Principles of Arboriculture" (See Ch 1_Intro to Arboriculture_Harris.pdf, p. 8-11), you should be able to explain each principle in the context of tree establishment and management.
2 ♦ Jan 14 ♦ Tues	▪ Tree identification (Ch. 2: Tree Identification, Lilly) ▪ Benefits and costs of urban trees: Assessing and quantifying the urban forest (See Ch. 14: Urban Forestry, Lilly; Ch. 3: Assessing and quantifying the urban forest; and Canvas® for additional readings and study guide). FYI only: *Health Benefits of City Trees: Research Evidence & Economic Values*. Dr. Kathleen Wolf, Univ. of WA (11/19/2019
3 ♦ Jan 16 ♦ Thurs	Physical, chemical, and biological properties of urban soils (Ch. 3: Soil Science, Lilly; Part 1, Ch. 2-4, Urban; see Canvas® for additional readings and study guide).
4 ♦ Jan 21 ♦ Tues	No class lecture: ▪ View the Utah State University Learn at Lunch Webinar Series: Soil Assessment for Urban Trees webinar, Dr. Bryant Scharenbroch, Univ. of Wisconsin, Stevens Point and Research Fellow, Center for Tree Science, The Morton Arboretum. Also see Archived Tree Fund webinars. ▪ Read Ch. 3. Soil Modifications, Soil Amendments and Tillage in *Best Management Practices: Soil Management for Urban Trees* (on reserve).
5 ♦ Jan 23 ♦ Thurs	Physical, chemical, and biological properties of urban soils (continued).
6 ♦ Jan 28 ♦ Tues	Tree biology: structure and function (Ch. 1: Tree Biology, Lilly and Canvas® for additional readings and study guide).
7 ♦ Jan 30 ♦ Thurs	Root systems of trees: growth, development, and management (Ch. 1: Tree Biology, Lilly; see Canvas® for additional readings and study guide).
8 ♦ Feb 4 ♦ Tues	Woody plant defense mechanisms: compartmentalization of decay in trees = C.O.D.I.T—wound effects & responses (Ch. 1: Tree Biology, Lilly; see Canvas® for additional readings and study guide).
9 ♦ Feb 6 ♦ Thurs	City of Greenville Urban Tree Care Program. Drew Smith, Parks & Grounds Administrator | Parks & Recreation, 423 E. Park Ave | Greenville SC 29601; dsmith@greenvillesc.gov | www.greenvillesc.gov
10 ♦ Feb 11 ♦ Tues	Tree selection: match the tree to the site OR fit the site to the tree (Ch. 6: Tree Selection, Lilly, and Canvas® for additional readings and study guide).
11 ♦ Feb 13 ♦ Thurs	Exam #1

Lecture # ♦ Date	Lecture Topic and Readings
12 ♦ Feb 18 ♦ Tues	▪ Design accommodations that improve tree planting spaces in urban environments (Ch. 3: Soil Science, Lilly; Part 2, Ch. 6, Make Space for Roots, Urban [on reserve]; and Canvas® for additional readings and study guide). ▪ Water relations in trees (Ch. 4: Water Management, Lilly, and Canvas® for additional readings and study guide).
13 ♦ Feb 20 ♦ Thurs	Woody plant fertilization: types, rates, placement, nutritional disorders, ANSI standards, BMPs (see Ch. 5: Tree Nutrition and Fertilization, Lilly, and Canvas® for additional readings and study guide).
14 ♦ Feb 25 ♦ Tues	Woody plant fertilization: types, rates, placement, nutritional disorders, ANSI standards, BMPs.
15 ♦ Feb 27 ♦ Thurs	Pruning young → mature trees, shrubs, and palms (Ch. 8: Pruning, Lilly; see Canvas® for additional readings and study guide).
16 ♦ Mar 3 ♦ Tues	Lecture in the SCBG: Pruning young → mature trees, shrubs, and palms.
17 ♦ Mar 5 ♦ Thurs	Nursery tree production (https://hort.ifas.ufl.edu/woody/nursery-production.shtml; see Canvas® for additional readings and study guide).
18 ♦ Mar 10 ♦ Tues	Nursery tree production (continued).
19 ♦ Mar 12 ♦ Thurs	Planting and establishing trees and palms (Ch. 7: Installation and Establishment, Lilly; see Canvas® for additional readings and study guide).
No lectures Mar 17 & Mar 19	SPRING BREAK
20 ♦ Mar 24 ♦ Tues	Planting and establishing trees and palms (Ch. 7: Installation and Establishment, Lilly; see Canvas® for additional readings).
21 ♦ Mar 26 ♦ Thurs	Field Trip: Bartlett Tree Research Laboratories, Charlotte, NC
22 ♦ Mar 31 ♦ Tues	Exam #2
23 ♦ April 2 ♦ Thurs	An LA's perspective on site modification and management to accommodate longlived urban trees. Danny Jones, Landscape Architect, Planning & Development, City of Rock Hill, Danny.Jones@cityofrockhill.com | www.cityofrockhill.com
24 ♦ Apr 7 ♦ Tues	Protecting existing trees (+ vegetation) and soil during construction (Ch. 13: Trees and Construction, Lilly; see Canvas® for additional readings and study guide). Protecting existing trees (+ vegetation) and soil during construction (cont'd).
25 ♦ April 9 ♦ Thurs	Protecting existing trees (+ vegetation) and soil during construction (cont'd).
25 ♦ Apr 14 ♦ Tues	Tree disorder diagnosis/treatment – Abiotic and biotic agents (Ch. 10: Diagnosis and Plant Disorders, Lilly; see Canvas® for additional readings and study guide).
26 ♦ Apr 16 ♦ Thurs	Tree disorder diagnosis/treatment – Abiotic and biotic agents II. (Ch. 11: Plant Health Care, Lilly; *BMPs: Integrated Pest Management*, 2nd ed. [on reserve]; and Canvas® for additional readings and study guide).
27 ♦ Apr 21 ♦ Tues	Is this tree safe? Introduction to tree assessment and risk management. Ch. 11: Plant Health Care, and Canvas® for additional readings and study guide).
28 ♦ Apr 23 ♦ Thurs	Introduction to tree assessment and risk management.
29 ♦ April 29 ♦ Wed	FINAL EXAM: 3 – 5:30 p.m.

All projects will be submitted as electronic files via the Assignments folder in Canvas®. Each submission must be in the specified format (Word and/or Powerpoint). Specific instructions for each project are posted in the Assignments folder of Canvas®.

Project #1: i-Tree. The first project involves "i-Tree, a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools. The i-Tree Tools help communities of all sizes to strengthen their urban forest management and advocacy efforts by quantifying the structure of community trees and the environmental services that trees provide." There are several i-Tree Tools, including i-Tree Landscape, i-Tree Canopy, i-Tree Design, i-Tree Eco, and others.

These tools will be used to determine the economic contributions of several of the trees that comprise the Clemson University Campus Tree Walk, which is presently under construction. Tommy Fallaw, Director of Custodial, Landscape and Recycling Services, University Facilities, and Paul Minerva, Campus Arborist, created a publicly accessible Working Tree Inventory page of our campus trees. From this list, your instructor selected 133 potential trees for the Campus Tree Walk.

You must submit your report on or before April 7 and present your tree management plan from April 7-23.

Several institutions of higher learning already have web-based public geographic information systems [that] identify the location, common name, description, scientific name and family of their campus trees. For example, see "Furman tree program reaches new heights", Spartanburg Community College Arboretum, Ole Miss Tree Trail, University of Arizona Campus Arboretum. Even municipalities have created interactive sites such as Aiken (Aiken Arboretum Trail) and Asheville.

Project #2. Tree Management Plan. The tree management plan encompasses a site evaluation including soils and microenvironment; tree, turf and ground cover health, quality of current maintenance practices, and condition; recommendations to improve tree health including what should be done immediately and what can be done in the next 2 to 10 years.

Prior to beginning this project, contact your instructor to have your site approved. Normally 5 to 10 pages are required to communicate what needs to be done.

You must submit your report on or before April 7 and present your tree management plan from April 7-23.

Appendix 2. SQ3R Study Method

To encourage you to learn and study the information from the textbook and other sources, use the **SQ3R** method to discover the important facts and ideas that are contained in the readings and master and retain that information to prepare you for the exams.

SQ3R is an abbreviation for a step-by-step process that stands for Survey, Question, Read, Recite, and Review. When applied to reading assignments, these 5 steps will help you study more efficiently and effectively. While this method will take time and practice to master, once it is learned and applied, it will no longer be necessary to re-read textbook chapters. The added benefit of using the SQ3R Method is that often you will find your own questions on a quiz or exam. Because many instructors use the textbook as an outline for their courses, test questions will be coming from the same source as yours. As you review your notes and texts, you will be able to predict and prepare answers for many exam questions.

1. **SURVEY:** (before class) This survey should take no more than 10-25 minutes, even on the longest chapter. The purpose of surveying the chapter is to get a general idea of what it is going to be about, what kind of information the author gives, how many sub-topics the information is broken down into, and how much time you will have to spend reading it.

    - Chapter Title
    - Introduction
    - Objectives
    - Vocabulary
    - Summary
    - Review questions
    - Boldface headings
    - Graphics and their accompanying captions

2. **QUESTION:** (before class) Turn each boldfaced heading into a question by using one of the following words: who, what, where, when, why, or how.
    The reason for creating a question out of each heading is to set a purpose for reading the material in more detail. When you are reading to find the answer to a specific question, you are reading actively.

3. **READ:** (after class) Actively read the section of the text accompanying the heading for an answer to the question you asked yourself in step 2. The answer will usually be made up of the main idea(s) of the paragraph(s) and the supporting details. Read the section to find the answer. The purpose of reading is to find the answer to your question.

4. **RECITE:** (after class) Recite the answer to each question to yourself. Put the answer into your own words, or rephrase the author's words. Be sure that you can recall the answer, not just recognize the information as correct. Write the questions in your notebook along with a few key words or phrases that summarize the answer. The purpose for doing this is to help you think about and understand what you have read. When you rewrite or rephrase what you read, your comprehension and retention will improve.

5. **REVIEW** (before next class) To review, cover the answers and ask yourself the questions. If you can't answer the question, look at your notes and test yourself again. Once you are sure you know and understand the question and answer, check it off. The purpose for reviewing is to help you prepare for the eventual test. Remember that very few people read textbooks for pleasure; they are read to acquire information and to remember and apply it in a testing situation. Reviewing helps you remember the information.

Source: Reading and Learning The SQ3R Method of Textbook Study, NHTI—Concord's Community College.

Advising

You are assigned to an adviser upon admission into the program. Regular interactions with your adviser will make your academic journey more efficient and effective. Questions about your adviser should be directed to your academic area office.

Help with Technology

https://ccit.clemson.edu

The CCIT Help Desk is available by telephone (864-656-3494) or email (ITHelp@clemson.edu). Check the web site for available hours.

Assistance with Canvas® may also be available through the CCIT Technology Services area. Send an email message to ITHelp@clemson.edu.

Library Services

https://libraries.clemson.edu

The library web pages connect you to the many services and resources provided for Clemson University students, including online databases, e-journals, electronic books, interlibrary loan, etc.

Marguerite "Maggie" Helen Albro <mdunn3@clemson.edu>, librarian to the College of Agriculture, Forestry, and Life Sciences, shared this information with me:

- If your students will be doing research projects, feel free to put my name and contact information in your syllabus and encourage them to get in touch with me if they hit a snag when trying to locate sources: Maggie Albro, 304A Cooper Library, mdunn3@clemson.edu, 656-5168.
- If you discover any time in the semester that they do not have the research skills you assumed they did, get in touch, and we can set up a class session, either here at the library or in your classroom.
- If you find that many of them are having difficulty with a particular research task (like finding full-text articles), let me know, and I can pop into your class for 10 minutes and show all of them how it's done.
- I can create research guides tailored to specific course assignments. There is also a general one for Environmental Science; feel free to email the links to students and/or put them in the Canvas space for your course.

Maggie Albro, MLIS, Science Librarian | Clemson University Libraries } Office: 864.656.5168 mdunn3@clemson.edu |Pronouns: she/her/hers

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Student Accessibility Services

If you have a disability that may impair your participation in this course, you need to notify the course instructor and the Office of Student Disability Services before the course begins. This web site describes the available services, policies, and procedures.

VA Educational Benefits

This site provides you with information about the Veterans Administration Education Benefit program at Clemson University.