ECOSYSTEMS OF FLORIDA (BOT 5695C: 3 credits) SPRING 2020 SYLLABUS Fridays, periods 3-6 (9:35 AM – 1:40 PM) (2 hours of "lecture" and 2 hours of lab per week) (reality: all day on lots of Fridays, but in great places doing ecology)

Instructor:

Francis E. "Jack" Putz, Distinguished Professor

Research Areas: conservation biology, tropical forest ecology and management, fire ecology, restoration, ethnobotany, sea level rise impacts in Florida, the art-science nexus Office Hours: Wednesdays 1300-1600 h, by appointment, or take a chance and drop by Office: Carr 209; telephone 392-1486; e-mail: <u>fep@ufl.edu</u>

- **Course Objectives**: To acquaint course participants with major Florida ecosystems and some pressing local environmental issues while helping them develop their research skills. Natural history and field research methods will be stressed along with ways to communicate research results. Lectures and readings on Florida ecosystems and ecological methods will be supplemented by participant-designed field problems, preparation and submission of manuscripts, and oral presentations of the results of field studies.
- **Readings**: Most readings for the course are on electronic reserve. Additional materials will be on reserve at Marston Science Library, e-mailed as PDFs, or otherwise made available. The instructor's newly published book of nature essays entitled <u>Finding Home in the Sandy Lands of the South: A Naturalist's Journey in Florida</u> is strongly encouraged—if readership is down, he promises to inflict verbal versions of these stories on the class *ad nauseam* (available from Kindle and Amazon). To help class participants develop a "sense of place" (and to give them an excuse to read some Florida fiction), everyone must also read at least one of the following historical novels: <u>The Yearling</u>, <u>Don Juan McQueen</u>, <u>A Land Remembered</u>, <u>River Without End</u>, or two "Cracker westerns" by Lee Gramling, Jon Wilson, or Rick Tonyan (the instructor abjures any responsibility if participants end up readings >2 Cracker westerns). Libraries stock these novels, used copies are readily available at local shops and web outlets, and I have a stack of "lenders"---alternate readings will be entertained.
- **Class Attendance and Make-Up Policy**: Class attendance is expected. Each unexcused absence will result in a 10 point reduction in the final grade. Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation. Assignment submitted late will lose 5% per day.
- **Grading**: Your grade will be calculated as follows: 93-100% A; 90-92% A-; 87-89% B+; 83-86% B; 80-82% B-; 77-79% C+; 73-76% C; 70-72% C-; 67-69% D+; 63-66% D; 60-62% D-; 0-59% E. Grades will be rounded to the nearest whole point (e.g. 89.5 = 90, 89.49 = 89)

TASK	DUE DATE	% FINAL GRADE
Statistics workshop assignment	Week 1	3
Florida time line	Week 2	7
Fire proposal	Week 4	5
Manuscript version 1	Week 5	10
Exotic article summary	Week 7	5
Manuscript version 2	Week 8	15
Oral presentation	Week 10	5
Restoration articles (summaries)	Week 11	5
Florida in fiction analysis	Week 11	5
Plant quiz	Week 13	15
Final examination	Week 13	25

Note on Manuscript Submission: This short paper (3-5 pages) is to be submitted and then resubmitted after review using the style described in the "Instructions to Authors" for Ecology, as detailed on the Ecological Society of American (ESA) website. A detailed grading rubric will be provided.

- **Recommended Texts**: Ecosystems of Florida (EF); The Elements of Style (Strunk and White); and, a plant guide (e.g., Godfrey, R.K. Trees, Shrubs, and Woody Vines of Northern Florida and Adjacent Georgia and Alabama). Required readings will be provided to you as PDFs or made available on our e-learning site, but you will also be expected to search the primary literature yourselves.
- **Pedagogical Philosophy**: If you know a bit about my ideas about learning, it may help you to understand and accept how this class will unfold. I claim no particularly inspired insights about education, but I try to act in accordance with the following precepts and otherwise promote participatory, learner-centered activities:
- 1. The extent to which adults learn new material varies with whether it is simply heard (20%), heard and seen (40%), or experienced (80%).
- 2. Experiential learning situations in which learners learn from each other and the trainer learns from the learners should be maximized while use of traditional transmission-based approaches should be minimized.
- 3. Participatory learning is active, not passive.
- 4. Adult learners prefer to be self-directed or at least to share responsibility for their own learning.
- 5. Motivation to learn increases when the topic under consideration fills an immediate need.
- 6. Maximum learning from an experience occurs when there is time to reflect back on it, draw conclusions, and derive principles for application to similar situations in the future.
- 7. Provide lots of corrective but supportive feedback.
- 8. Show respect for the learner and otherwise foster trust so as to assist the learning process.
- 9. Provide a safe, cheery, and comfortable atmosphere for learning.

Notes:

- --This syllabus is a working document that is subject to change, open to negotiation, and otherwise mutable as appropriate for a 5000-level course, especially one with the stated pedagogical philosophy. In other words, adoption of an "adaptive management" approach will require some departures from the pre-supplied syllabus.
- --Class participants have a wide variety of backgrounds, interests, and professional aspirations. Efforts will be made to tailor the course to the needs and desires of each participant, but such modifications require a free flow of information and suggestions.
- --Superimposed on this tentative syllabus is a day of fire. Given the vagaries of scheduling controlled burns, we will have to go whenever the burn bosses give the go-ahead—justification to your other instructors will be provided if necessary and they will be invited to participate.

<u>Course Schedule</u>

Week 1, Part 1: Overview of the course, reflections on field ecology as a Science, and an assessment.

Part 2: Introduction to the ecosystems of Alachua County: learn the dominant arboreal species and start to read landscapes

Assignment: Learn some basic Floridian geography (the <u>Atlas of Florida</u> is a good start or use Google Maps, Google Earth, or etc.)—you will be expected to be able to draw a quick sketch of Florida showing the prominent physiographic features (e.g., major rivers, mountains, and lakes). Start making your own reference collection with diagnostic snippets of plants.

Read:

- (1) Ecosystems of Florida (edited by Myers and Ewel) pages 3-10 (by Ewel).
- (2) Platt, W.J. 1999. Southeastern pine savannas. In, Anderson et al. (editors), 1999. <u>Savannas, Barrens, and Rock Outcrop Community of North America</u>.
- Learning Objectives: Recognize the dominant arboreal species, know some of their basic natural history, and start to "read local landscapes."

Week 2: Part 1: Statistics workshop. Be prepared to do a lot of graphing---with pencils, rulers not needed.

- Learning Objective (Part 1): Increased capacity to handle data, think about variance, and understand what statistical tests do and how. This is NOT a statistics course, I am NOT a statistician, and you will NOT be expected to master lots of statistics, but everyone should leave the course with a high comfort level with basic tests such as Student's t, ANOVA, regression, and contingency analysis. Statistics is NOT a formal course prerequisite, but you will nonetheless be expected to graph and analyze your data appropriately. Part 2: Florida Museum of Natural History with emphasis on the paleoecology of Florida.
- Assignment: Draw a basic timeline that starts at the Big Bang and proceeds to the present in reducing orderof-magnitude jumps. Use whatever historical resources you can find (e.g., The New History of Florida) to populate your line with >10 Florida-relevant events.
- Read: 1. Watts, W.A. 1980. The late Quaternary vegetation history of the southeastern United States. Annual Review of Ecology and Systematics 11: 387-409.
 - 2. Randazzo and Jones (editors). The Geology of Florida Pages 1-12 (by W. Schmidt), pages 57-67 (by Scott), and pages 217-249 (by Upchurch and Randazzo).
- Learning Objective (Part 2): Develop your sense of time as it relates to Florida and improve your thinking about the sorts of data we will collect this semester.
- Week 3, Part 1: Climate of Florida workshop. Bring to class a printout of a Florida weather map from some interesting date.
- Read: Chen and Gerber, "Climate," in Ecosystems of Florida.
- Learning Objective: Be able to use first principles to explain the main climatological patterns affecting Florida.
- Assignment: Before class, be sure you have reviewed and understood the basic principles of climatology provided (clarification provided upon request).
- Select and start to read your Florida-based novel. Make note of important passages in which the author represents, misrepresents, or otherwise employs the ecosystems of Florida.
- Part 2: Ecology of fire. Experience with fire—what exactly we will do depends on the weather, fire permits, and etc. Much time spent brainstorming.
- Learning Objectives: Understand the essential physical features of fire and how they relate to the role of fire in shaping ecosystems. Accumulate enough first-hand experience with fire for the conceptualization of an informed fire research project.
- Read: Handouts and pages 1-56 in R.J. Whelan (1995) The Ecology of Fire.
- Assignment: Hand in a single declarative statement in the form of a falsifiable hypothesis accompanied by a graph depicting the expected results if your hypothesis is supported.
- Week 4, Part 1: Oral presentations of fire project proposals, 2 minutes each (timed). No more than 3 powerpoint slides permitted. Grading rubric available on e-learning site.
- Read: Brown et al., "Soils" in EF pages 35-69.
- Learning Objective: Recognize and implement the recommendations in the "Grading Rubric for Oral Presentations."
- Part 2: McCarty Woods---long pants and closed-toed shoes recommended. Topic: Soil infiltration, data handling, minimum sample sizes. Small group "thought projects" on soil compaction
- Read: Brown et al., "Soils" in EF pages 35-69.
- Learning Objectives: Develop experience with handling data (i.e., graphing), dealing with variance, generating falsifiable hypotheses based on field observations, designing manipulative experiments to test those hypotheses, and thinking through the statistical analysis of the resulting data. Also understand ultisols.
- Assignment: Hand in a 2-3 page research proposal for your fire ecology project. Use the format of an NSF Dissertation Improvement Grant along with the Instructions for Authors for the journal Ecology. Some of the sections will be VERY short, but they should all be included. Be sure to have >3 references from the primary literature (i.e., websites and textbooks do not constitute acceptable citations). Also include a

graph of the expected results if your hypothesis is supported. Note that you are likely to employ some of the prose in this proposal in the write up of your fire experiment.

<u>Week 5:</u> Global climate change as related to Florida. Coastal ecosystems and sea level rise. **Read**:

- (1) Williams et al. 1999. Ecology 80: 2045-2063.
- (2) Putz, F. E. 2012. Coastal forest retreats as sea level rises. The Palmetto 29: 8-11.
- (3) Misra et al. 2011. Climate scenarios: A Florida-centric view. Florida Climate Institute White Paper (scan in its entirety and read the sections of interest).

Assignment: Go to http://gulfmex.coastalresilience.org/ and play around for 30 minutes or so.

Week 6: Sand pine scrub ecology, management, and edge effects.

Read:

- (1) Menges, E. 1999. Ecology and conservation of Florida scrub. In, Anderson et al. (editors), 1999. Savannas, Barrens, and Rock Outcrop Communities of North America.
- (2) Browse through the provided selection of papers on edge effects and then read a few (>2) to get ideas for an edge effect research project that you will conduct in sand pine scrub in Ocala National Forest. We will hold a workshop on edge proposals, so be sure to read in advance and come to class with ideas for research projects.
- **Learning Objective:** Improved capacity to generate falsifiable hypotheses based on knowledge of the literature and ecological insights.

Week 7, Part 1: Hammocks and hardwoods. Plant display and workshop.

Read: Platt, W.J. and M.W. Schwartz. Temperate hardwood forests. Pages 194-229 in EF.

Learning Objective: Identification of the major hammock hardwoods based on vegetative characteristics.

Recognize distinctiveness of the gap-phase mode of regeneration of many hammock tree species.

Part 2: Exotic invasive species workshop.

- <u>Week 8</u>: Ecology of flooding. Swamp ecology at Cypress Highlands and thereabouts. Be prepared to get wet. A virgin cypress strand and a bayhead are featured.
- **Read:** (1) Relevant chapters from plant physiology books or appropriate websites on anaerobiosis. (2) Ewel, K.C., 1990. Swamps. Pages 281-323 in <u>EF</u>.
- **Learning Objectives:** Understand why plants drown, why histosols are usually wet, and why droughts kill so many wetland trees.

Week 9: Fire experiments.

Week 10: Oral presentations of field research results.

Learning Objectives: This presentation will be graded on the basis of the rubric provided on our e-learning site, the recommendations of which should be reflected in the structure of the talks, any slides presented, and the mode of presentation.

Week 11, Part 1: Pine workshop,

Assignment: Bring samples of 3 species with cones of both genders if possible.

Read: Keeley and Zedler 1998. Evolution of life histories in <u>Pinus</u>. Pages 3-40 in, Richardson, D.M. (editor). The Ecology and Biogeography of <u>Pinus</u>.

Part 2: Restoration ecology and practice, Florida style.

- **Read:** Browse recent issues of Restoration Ecology and read two articles, at least one of which should be of a philosophical nature and neither should be about Florida or longleaf pine.
- **Assignment:** Submit via e-mail as a Word File by 1700 h on the day before class a 100-word essay about each article in which you explore the relevance of the articles to Florida. Be sure to include the complete citation and send the PDF. Enrich the class discussion with insights derived from your reading.

- <u>Week 11</u>: Forest ecosystem management or fiber farming, Florida style. **Read:** Jokela et al. 2004. Production dynamics of intensively managed loblolly pine stands...Forest Ecology and Management 192: 117-130. While you're at it, skim through the other articles in this special issue.
- Activity: During the class you will also each present an analysis of the use of the ecosystems of Florida in the Florida-based novel you read.

Week 12: Models of Florida ecosystems: succession and ordinations.

- **Read:** Duever, M.J. and R. E. Roberts. 2013. Successional and transitional models of natural South Florida, USA, plant communities. Fire Ecology 9: 110-123.
- Learning Objectives: Improved modeling skills though development of conceptual models of the ecosystems of Florida.
- <u>Week 13</u>: PLANT QUIZ: Tests your ability to recognize the species on which we focused this semester and relate pertinent aspects of their natural history.

FINAL EXAM: Cumulative, heavily based on the assigned readings, open book, starts in class, submit on paper in (or under the door of) 209 Carr Hall.

- **Students Requiring Accommodations:** Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.
- **Counseling and Wellness Center**: Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- **University Honesty Policy:** UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conducthonor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor.
- **Course Evaluation:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.
- **Software Use**: All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.