





# Plant Ecology—Spring 2025 (PCB3601C)

## Professor:

F.E. “Jack” Putz, Distinguished Professor

Email: [fep@ufl.edu](mailto:fep@ufl.edu) Website: <http://people.clas.ufl.edu/fep/>

209 Carr Hall Office Telephone: 352 392 1486

On-Line Office Hours: Thursdays 1:00 to 3:00 PM and by appointment.

## Laboratory Instructor:

Steven Cassidy

E-mail: [stevencassidy@ufl.edu](mailto:stevencassidy@ufl.edu)

Office hours appointments via Zoom (<https://ufl.zoom.us/j/99758279124>); in-person in Carr 619

Elizabeth White

E-mail: [elizabethwhite1@ufl.edu](mailto:elizabethwhite1@ufl.edu)

Office hours by appointment via Zoom (<https://ufl.zoom.us/j/98347091687>) or in Dickinson 357

**Lectures:** Tuesday & Thursday, Period 2, 8:30-9:20 in 211 Bartram Hall (BAR 211)

**Labs: 105** Rolf Hall (attend ONE per week) Periods 6-9, 12:50-4:55 PM.

Monday (class #13551), Tuesday (class # 13552), or Wednesday (class # 13554).

For labs specified as “Field” in the syllabus (\* on schedule), meet at the specified location at the specified time. We often depart from the parking lot behind Bartram Hall but be sure to check your syllabus. We will try to return to campus on time, but provisions should be made in case we fail to do so. Vans depart promptly at 12:50 (don’t be late).

Although the labs (1 per week) and lectures (2 per week) will be face-to-face, some of the course will be via ZOOM and through the course CANVAS website (<https://elearning.ufl.edu/>).

## READINGS AND REQUIRED MATERIALS

REQUIRED: Plant Ecology Laboratory Manual, **available by 11 January from Target Copy** on West University Avenue across from the UF Library.

REQUIRED: A bound field notebook specific for this course. We recommend that you obtain a field-book with waterproof paper such as the Elan e-64 soft-cover with 50 pages.

RECOMMENDED: A 10X hand lens (=loope = magnifying glass).

RECOMMENDED: Finding Home in the Sandy Lands of the South by F.E. Putz, available from Amazon and on Kindle, but also uploaded onto the CANVAS site as a PDF.

**Software:** The required software packages are CMAP, WORD, POWERPOINT, & EXCEL

## Description

This course introduces ecology as a scientific discipline with emphasis on Floridian plants, ecosystems, and environmental challenges. By the end of the course, students should be familiar with ecological principles related to how plant populations & communities interact with their environments at local, regional, & global scales. The labs emphasize the ability to ‘read landscapes,’ which requires the ability to recognize common plants, vegetation types & ecosystems. The other major emphases are on hypothesis testing and scientific reporting through field experiments, manuscripts and posters, and oral presentations.

**Prerequisites:** basic training in biology is required (the more you know about plants the better) as is willingness to experience nature firsthand with all its pleasures and pains (e.g., ticks, chiggers, mosquitoes, snakes, poison ivy, and stinging nettles).

## Field Trip Preparation

Listed below are the tools required (1-6) or recommended (7-13) every time we go to the field.

1. **Long pants** (first line of defense against catbrier vines, snakes, chiggers, and ticks), preferably light in color so that “seed ticks” show up like a patch of pepper.
2. **Boots or sturdy closed-toed shoes.** We will visit wet places with catbrier vines, snakes, chiggers, burning embers, smoldering duff, and ticks. Rubber boots are fine, except for controlled burns. **NO SANDALS.**
3. **Water** or dilute Gatorade (and something to carry it in so your hands are free).
4. **Field notebook and pencil** - bound, waterproof with half the pages graph paper. Be sure to date every page and note your location. The first pages of the notebook should contain space for a table-of-contents and be labeled with your name and contact information. Always bring it; your instructor may announce a surprise notebook check.
5. **Random number table:** extract and write at least 100 on the inside cover of your field book.
6. **Raingear** - a folding umbrella works well.
7. Bug repellent – please apply in a well-ventilated place.
8. Food - blood sugar levels must be maintained for the duration.
9. Hand lens - 10X or 15X—reasonably good ones can be purchased for about \$10.
10. Calculator or phone, the latter for taking pictures.
11. Binoculars if you have them.
12. Hat and sunscreen.
13. Ruler - also mark the outside of your field book with centimeters.

**IMPORTANT CAUTIONARY NOTE:** In addition to beautiful landscapes, fascinating ecosystems, and compelling environmental problems, Florida offers us ticks, chiggers, mosquitoes, and poisonous snakes. We will do all we can to assure your safety in the field, but you need to dress appropriately, follow instructions, and otherwise being careful so as to minimize risks and unpleasanties. The following contain information concerning certain hazards of working outdoors in Florida:

- Chiggers: <http://edis.ifas.ufl.edu/pdffiles/IG/IG08500.pdf> or <http://pherec.org/EntGuides/EntGuide6.pdf>
- Ticks & Lyme Disease: <http://edis.ifas.ufl.edu/pdffiles/MG/MG20400.pdf> or <http://fme1.ifas.ufl.edu/buzz/clticks.shtml>
- Heat: [http://solutionsforyourlife.ufl.edu/hot\\_topics/agriculture/heat\\_stress.html](http://solutionsforyourlife.ufl.edu/hot_topics/agriculture/heat_stress.html)

- Dehydration: <http://fineinstitute.com/patient-education/?id=11913&lang=English&db=hlt&ebSCOType=static&widgetTitle=Spinal+Links>
- Discrimination and intolerance: <https://www.nature.com/articles/s41559-020-01328-5>

**Minimum Technical Skills:** To complete your tasks in this course, you will need a basic understanding of how to operate a computer and how to use word processing software. During the course you will have opportunities to carry out field research from hypothesis formulation through experimental design, field implementation, data analysis, manuscript preparation, and oral presentation.

**Course Goals and Objectives:** This course is designed to reflect current research on learning. For example, this pedagogical research (i.e., studies on the science of teaching) reveals that students (both strong & not-so-strong) learn better when they work in cooperative groups & when they have opportunities to discover information for themselves that is relevant to their own lives. To foster learning, therefore, inquiry-based activities are extensively used in this course. Inquiry-based learning looks remarkably like the scientific method. Most labs begin before you report for your session—in preparation for each lab, you will typically be asked to answer or reflect on a situation (Pre-Lab Questions to be submitted on-line before your scheduled lab). During many labs, you will formulate hypotheses, design experiments, carry out experiments, analyze data, reach conclusions, & suggest modifications to experiments. Although this creative & iterative process is at the heart of Science, it is too often disregarded to the point that Science seems like boring drudgework and meaningless memorization.

A prerequisite for effective “active learning” is that class participants come to each session prepared. Generally, this preparation involves reading the assigned material that will be provided. Coming to class prepared to take notes is also essential. In recognition that all class participants have conflicting demands on their time, in addition to your inherent thirst for ecological knowledge, thorough reading will be motivated by pre-lecture quizzes (on-line) that will weigh fairly heavily in the calculation of course grades.

Given that every learner is different and that our approach to teaching constantly evolves, often in a saltatory manner, the syllabus is not specific about the number of assignments nor the natures of all of them. This vagueness will allow the instructors to respond to perceived needs in an adaptive manner. For example, if many class members are struggling with a topic or concept, additional time & possibly assignments will be devoted until the learning impediments are removed or circumvented.

**Over-Arching Learning Goals:** To understand how local plant populations and communities are affected by natural and anthropogenic environmental factors through lectures, discussions, and hands-on experience with the scientific processes of hypothesis formulation, experimental design, data analysis, and written and oral presentation of research results.

**Underlying Theme:** Importance of plants for sustainable resource use and maintenance of hospitable environments for humans & other organisms.

### **Key Concepts & Learning Objectives**

1. **Biogeography:** geological history of the biosphere (with local emphasis); global & regional patterns of plant species & life form diversity. - *Learning objective assessment:* Ability to describe global & local biogeographical regions as well as the major paleoecological events (e.g., continental drift & climate change) responsible for their development.
2. **Climate & Climate Change:** physics of climatological phenomena; global climate drivers; climate diagrams; past & on-going climate change. - *Learning objective assessment:* Ability to explain regional climate patterns from basic physical principles, global atmospheric circulation patterns, ocean currents, & distributions of continents & major mountain ranges.

3. **Resources & Productivity:** above & below ground resource acquisition & use; mycorrhizae; photosynthetic light utilization by leaves, whole plants, & vegetation; CO<sub>2</sub> limitation on photosynthesis; O<sub>2</sub> limitations on respiration; water-use efficiency. - *Learning objective assessment:* Ability to explain how environmental factors influence net photosynthesis & ecosystem productivity using graphs & concept maps.
4. **Populations, Communities, & Landscapes:** structures & dynamics of plant populations & communities; life histories; competition; disturbance (especially fire); stress (especially fire suppression & flooding); succession; regeneration; invasive exotic species. - *Learning objective assessment:* Ability to explain how population & community dynamics of plants are influenced by disturbance, stress, & species interactions.
5. **Biogeochemistry (Nitrogen, Phosphorus, Carbon, & Water Cycles):** soil structure & formation; nutrient cycles; anthropogenic effects (e.g., increased nitrogen deposition); mitigation & adaptation to climate change. - *Learning objective assessment:* Ability to explain natural & anthropogenic factors that influence soil types, mineral nutrient availability, & plant community characteristics.
6. **Global Change, Biodiversity & Conservation:** climate-change impacts, land-use change, fragmentation & edge effects, conservation strategies, biofuels, urban ecology, & human “footprints,” life in the Anthropocene. - *Learning objective assessment:* Ability to explain trade-offs involved in biodiversity conservation, economic development, & mitigation of climate change.
7. **Scientific Method:** formulation of falsifiable hypotheses, experimental design, data graphing & basic statistics (mean & variance), avoidance of bias, benefits of replication, minimum detectable difference, power. - *Learning objective assessment:* Ability to formulate novel hypotheses, design experimental protocols to falsify those hypotheses, graph/analyze/interpret results, and present studies in oral and written forms in manners appropriate for science.
- 8 **Restoration Ecology and Invasive Exotic Species:** different approaches to restoration/reforestation/reclamation; restoration as a redemptive opportunity for destruction; invasiveness vs. invasibility. -*Learning objective assessment:* Recognize some of the pros and cons of different approaches to ecological restoration; understand the factors that govern the invasibility of communities and the invasiveness of species.

**Exams:** There will be two "midterm" exams and a cumulative "final" exam. Each exam will cover material from video lectures, fieldwork, comprehension checks, learning activities, the online discussions, and the assigned readings.

*Make-up Exams:* No make-up exams will be given without prior permission or documentation of illness. Students that will miss an exam due to a pre-arranged university-approved excused absence *should let the instructor know a minimum of two weeks in advance. These students may be required* to take the make-up exam before the scheduled in-class exam. In case of illness on exam day, a letter from the student's primary care provider is required. This letter must state that the student was unable to complete the exam on the scheduled date (i.e., a letter stating only that the student was seen in a clinic is not sufficient) and must go through the Dean of Students Instructor Notification system (<https://care.dso.ufl.edu/instructor-notifications/>). A personal matter must also go through the same process. These notes must be received within five business days after the exam.

**Course Grading:** All grades will be posted on e-Learning. It is the responsibility of the student to check their grades to make sure they are accurate. If there is a discrepancy, you must let us know within ONE week of the grade being posted on e-Learning. The numerous graded assignments administered during ‘lectures’ are intended to promote learning and to provide instructors with regular assessments of the effectiveness of their teaching. In aggregate these assignments are weighted heavily in calculation of final course grades.

Assignments	Percentages
Exams (3)	30% (10% each)
Assignments	35%
Labs	35%

Point Range (%)	Letter Grade
≥ 90.00	A
≥ 86.66	A–
≥ 83.33	B+
≥ 80.00	B
≥ 76.66	B–
≥ 73.33	C+
≥ 70	C
≥ 66.66	C–
≥ 63.33	D+
≥ 60	D
≥ 56.66	D–
< 56.66	E

Information on UF’s grading policies and the assignment of grade points can be found here: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>. Please do not request individual special treatment at the end of the semester; **grades are not adjusted for any reason**. Plan to do well on all exams and other assessments from the beginning of the semester; if you are having difficulty in the class, please let your instructors know *before* the exams.

**Laboratory:** Your laboratory grade will be based upon two practical exams, in class exercises, and pre- and post-lab assignments. Please see your lab instructor for policies, expectations and the schedule of assignments. BOT2800C has a Materials and Supply fee of \$108.00.

**Time Commitment:** The UF College of Liberal Arts and Sciences assumes that each student will devote 3-4 hours per week per credit-hour to each course, including time in lectures and labs. Because PCB3601C is 3 credits, each student should therefore expect to devote 9-12 hours per week to this course. If you find yourself spending more than the recommended number of hours per week on average, discuss this with your course instructor to see if you can refine your study habits. If you find yourself spending less than the recommended number of hours per week on average, you should recognize that this will probably be reflected in poor performance on the various assessments, causing you to receive a lower overall course grade.

Attendance and make ups: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/#absencetext>

If you are experiencing flu symptoms, please err on the side of caution and do not attend lecture or lab until you are sure you are not contagious. Course materials will be provided to you with a documented absence, and you will be given a reasonable amount of time to make up work. We will work with you to make sure that you are not penalized for being responsible and staying away when you could be contagious.

We understand that absences happen, but if you make this a habit, you will perform poorly in this class. *All lab sessions are required.* If you know in advance that you are unable to attend your lab section (e.g. conference, religious holiday), please contact your TA promptly to try and arrange for you to attend one of the other lab sections. Students who arrive late to lab will miss important introductory material and directions or be left standing in the parking lot.

Academic Honesty Policy: All students registered at the UF have agreed to comply with the following statement: “I understand that the UF expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.” In addition, on all work submitted for credit the following pledge is either required or implied: “On my honor I have neither given nor received unauthorized aid in doing this assignment.”

Cases of plagiarism or other academic dishonesty will not be tolerated and may result in grade penalties or other sanctions. At a minimum, each incident of academic dishonesty will result in a zero on the assignment, a course grade penalty of one full letter grade, and a report to the Student Conduct & Conflict Resolution (see <https://sccr.dso.ufl.edu/process/student-honor-code/> for more information about this process). Academic dishonesty includes (but is not limited to) collaborating with others on course assignments or quizzes without specific authorization, utilizing prohibited materials during quizzes, copying the work of other students in whole or in part, allowing other students to copy your work or otherwise sharing completed assignments in person or online (during the semester or in the future), discussing or sharing quiz questions or answers with other students, giving other students the password for locked quizzes, and plagiarism, including insufficient paraphrasing.

If you have knowledge of any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information, refer to the UF’s [Academic Honesty Guidelines](#):

Use of GroupMe, Discord, and similar messaging applications facilitate communication and can be an important part of creating community in a course and can be valuable for studying and group projects. However, such groups typically exclude instructional staff and present great temptation for unauthorized academic dishonesty as described above. In this course, the use of GroupMe, etc. to share answers, screenshots of quizzes, “comparing” work, etc. is not authorized with the exception that the discussion of material related to lecture and lab for the purposes of studying is permitted, because it replaces or enhances classroom discussion that is encouraged among students. Simply posting answers (or asking others to “check” your answers, etc.) violates the intent of any exercise and turns it into a waste of time. ANY discussion of quiz or exam questions or answers is not allowed in any online forum once the first student has begun a quiz (including lab quizzes), including after the exam is concluded. All students participating in such forums will be presumed to have benefitted from posts on GroupMe and will be subject to penalties outlined above.

Class recordings: Students are allowed to record video or audio of class lectures but how these recordings may be used is strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to UF, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures



without the written consent of the instructor. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Students are encouraged to employ critical thinking and to rely on data and verifiable sources to interrogate all assigned readings and subject matter in this course as a way of determining whether they agree with their classmates and/or their instructor. No lesson is intended to espouse, promote, advance, inculcate, or compel a particular feeling, perception, viewpoint or belief.

Accommodations for students with disabilities: Students who will require a classroom accommodation for a disability must contact the Dean of Students Office of Disability Resources, in 001 Reid Hall (392-8565) <https://disability.ufl.edu/students/get-started/>. Note that the student should provide documentation of a requirement for accommodation by the second week of classes. No accommodations are available to students who lack this documentation. It UF's policy of that the student, not the instructor, is responsible for arranging accommodations when needed. Once notification is complete, the Dean of Students Office of Disability Resources will work with the instructor to accommodate the student.

Course Evaluations: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the e-mail they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Resources Available to Students: College can be a very stressful but resources are available on campus to help students meet academic goals and solve personal problems that interfere with their academic performance. If you are having emotional or academic difficulties, there is substantial support available.

#### **Health and Wellness:**

-U Matter, We Care: If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 294-2273, or visit [U Matter, We Care website](#) to refer or report a concern and a team member will reach out to the student in distress.

-Counseling and Wellness Center: Visit the [Counseling and Wellness Center website](#) or call 392-1575 for information on crisis services as well as non-crisis services.

-Student Health Care Center: Call 392-1161 for 24/7 information to help you find the care you need, or visit the [Student Health Care Center website](#).

-University Police Department: Visit [UF Police Department website](#) or call 392-1111 (or 9-1-1 for emergencies).

-UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [Visit the UF Health Emergency Room and Trauma Center website](#).

-GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, [visit the GatorWell website](#) or call 273-4450.

#### **Academic Resources**

-E-learning technical support: Contact the [UF Computing Help Desk](#) at 392-4357 or [helpdesk@ufl.edu](mailto:helpdesk@ufl.edu).

-[Career Connections Center](#): Reitz Union Suite 1300, 392-1601. Career counseling services.

-[Library Support](#): Receive assistance with respect to using the libraries or finding resources.

-[Teaching Center](#): 1317 Turlington Hall, 392-2010 or to make a tutoring appointment 392-6420.

#### **General Study Skills and Tutoring.**

-[Writing Studio](#): 2215 Turlington Hall, 846-1138. Brainstorming, formatting, and writing papers.

-Student Complaints On-Campus: [Visit the Student Honor Code and Student Conduct Code webpage for more information](#).

-On-Line Students Complaints: [View the Distance Learning Student Complaint Process](#).

## LAB SCHEDULE (one lab per week on M, T, or W), 12:50-4:55 PM (periods 6-9)

Week 1 (13-15 January): Looking at plants

Week 2 (20-22 January): No lab on M, but on T and W the lab available for week 1 review

\*Week 3 (27-29 January): Florida Museum of Natural History Hall of Fossils

Week 4 (3-5 February): Sampling lawn plants and applying basic statistics

\*Week 5 (10-12 February): Campus Natural Area and Teaching Laboratory (NATL)

\*Week 6 (17-19 February): Fire demonstration and pilot fire ecology research projects (or Paynes Prairie if weather not suitable for a fire)

\*Week 7 (24-26 February-): Paynes Prairie State Preserve **or** fire demonstration

\*Week 8 (3-5 March): Fire experiments (option #1) **or** Sea Level Rise and Coastal Ecosystem Change (late return if the latter)

\*Week 9 (10-12 March): Fire experiments (option #2), Morningside Nature Center, **or** Sea Level Rise and Coastal Ecosystem Change (late return if the latter)

### **Week 10 (17-19 March): No Lab: Spring Break**

\*Week 11 (24-26 March): Morningside Nature Center or Fire option #3

Week 12 (31 March-2 April): MEET AT McCARTY WOODS—Matrix Model of Forest Dynamics

Week 13 (7-9 April): Phylogeny, Functional Morphology, and Taxonomic Keys

Week 14 (14-16 April): Fire Research Oral Presentations

\*Week 15 (21-23 April): Suburban Ecology and Laboratory Practical

\*Board van at 12:50 PM behind Bartram Hall---don't be late.

## LECTURE SCHEDULE

1/13 Course introduction and hypothesis formulation

1/15 Climatology workshop

1/20 NO CLASS MLK DAY

1/22 Paleoecology

1/27 Plant water relations

1/29 More water

2/3 Carbon dynamics

2/5 More carbon

2/10 Fire ecology

2/12 More fire ecology

2/17 **Exam 1**

2/19 Global climate change

2/24 Sea level rise

2/26 Soil genesis and ecology

3/3 Nutrient cycling

3/5 Disrupted biogeochemical cycles

3/10 Nitrogen and carbon cycles

3/12 Lawn ecology, pollution, evil empires, and the American culture

3/16-21 **NO CLASS, SPRING BREAK**

3/24 Invasive exotics and novel ecosystems

3/26 Professor Jack's (mostly ineffective) efforts at nature conservation

3/31 **Exam 2**

- 4/2 Plant life histories and tradeoffs
- 4/7 Community ecology
- 4/9 Competition and tradeoffs
- 4/14 Herbivory and tradeoffs
- 4/16 Population ecology
- 4/21 Disturbance, succession, and community dynamics
- 4/23 Restoration ecology

**Final Exam TBD**