The Ecology of Climate Change, **WIS 3410**
Spring 2026

SYLLABUS 2026

Class Periods:
Tuesday; period 2-3 (08:30 – 10:25 am); Room: Keene-Flint Hall 0121
Thursday**;** period 3 (09:35 -10:25 am); Keene-Flint Hall 0121

Instructor: Dr. Brett Scheffers
Office: 215 Newins-Ziegler Hall
Email: brett.scheffers@ufl.edu
Phone: 352.846.0570
Contact/Office hours: Tuesday after class. Feel free to email me at any time. I will do my best to respond to emails within 24 hours. (Please email the instructor on Canvas).
Weekly course schedule: See below

UF course catalog description: Provide a broad overview of the ecological responses to climate change on the Earth. Students will learn about how climate change impacts ecological processes such as genetics, physiology and behavior, morphology, phenology and distribution, species interactions, communities and ecosystems. We will focus on observed impacts rather than predicted impacts of climate change on plants and animals in freshwater, terrestrial, and marine ecosystems.

Additional Course Description:
The Ecology of Climate Change will provide a broad overview of patterns and processes in climate change science. Students will gain an understanding of how climate change as well as other human disturbances impact ecological processes from the smallest gene to largest ecosystem level.

Course Format:
This course is divided into three central components: 1) class lecture, 2) class discussion and activities, and 3) natural history observation/out-of-class exercises. Various materials will be posted for students to download at the course Canvas site.

The course will consist of discussions of readings from a wide variety of sources, including both technical (e.g., scientific literature) and non-technical material (e.g., newspaper articles, web links, video).

Primary topics of the course cover genetic, physiology, behavior and morphology of species, their phenology and distributions, up through species interaction, communities and ecosystems. Throughout the semester students will execute several research exercises that complement discussions and readings and emphasize the scientific process and how it is applied in climate change science.

Research Projects: You will conduct a series of research activities on the morphology, physiology and activity patterns of animals. This includes a study on temperature

across the UF campus and short projects involving the invasive brown anole (*Anolis sagrei*) between urban gardens and forested sites. Pending weather/availability, we will do activities outside of class on-campus or we may visit the Butterfly Rainforest and other taxonomic collections available through the Florida Museum of Natural History. The objective of these projects (and a broader objective of the class) is to allow you the freedom to critically think about the research/scientific process and to allow you to build a personal research-based relationship with the content from your readings.

Discussion: We will thoroughly discuss and critique a large literature that addresses the impacts of global change on a range of ecological processes from genes to entire biomes. The purpose of these discussions will be to assess the objectives of each published paper, determine whether the science appropriately matches the objectives and contrast findings to the larger literature within global change biology. Importantly, the literature will complement your research activities and add breadth to your observations and interpretations of results.

Our discussion format follows a "think-pair-share" format. This activity first asks students to consider a question on their own and then provides an opportunity for students to discuss it in small groups, and finally together with the whole class.

Course Objectives:

By the end of the course, students should be able to…

- Create a climate change vulnerability assessment for species
- List and describe the core ecological processes that are studied in climate change science
- Describe the dominant climate gradients that exist on the Earth and explain how they are important for climate change ecology
- List and describe the primary methods and approaches for studying climate change ecology
- Summarize how climate change interacts with species genetics, morphology, and physiology
- Describe how phenology and life-cycle processes in plants and animals are shifting in response to climate change
- Describe how historical, current, and future climates shape species distributions
- Develop an understanding of the basis for species distribution models and how they are used in climate change research
- Recognize and describe how species interactions might escalate the impacts of climate change
- Identify the magnitude and scale at which communities and ecosystems are responding to climate change
- Setup and execute a case study on invasive brown anoles to assess interactions between urbanization, invasion ecology, and climate change
- Critically think about traditional conservation science and formulate hypotheses as to how it might change in the future under climate change

Course materials/website: All course readings, announcements, links to videos, grades, etc will be available on the Canvas e-learning website. **All email exchanges with the instructor should also occur in Canvas.** You will need your Gatorlink username and password to log into Canvas at http://elearning.ufl.edu/

Canvas site navigation (3 important tabs to remember): Home has background information for course**; Syllabus** contains the syllabus for the course as a download**; Modules** contains all content for course (this is a very important tab for getting week-to-week information for each class period).

Course readings/course text: All readings are found on the **Modules** tab for each week or under the **Files** tab. There is no assigned textbook for this course.

Suggested Text: There are no textbooks for this course. Please see the outline of readings below.

Prerequisite: BSC 2011

Course breakdown: In total, students will review 20-30 academic and popular articles (depending on class momentum) pertaining to climate change and global change biology. The class includes 7 quizzes on readings, 2 research/writing activities and 4 assignments. There will be a mid-term and final exam. Please see the *assignment table* for a break down of assignments, grades, and workload intensity for the semester.

Assessments:

Quizzes and Assessments: Tentatively, there are up to 14 quizzes given during the course (~1 quiz per week). This number of quizzes will likely change (increase/decrease) pending our progress during the course. Quiz questions are derived from information delivered in class lectures, assigned readings, and short research activities or exercise that can be assigned during class or outside of class. Quizzes (or other forms of in-class assessments) are provided to ensure that students are engaged with assigned readings and out-of-class exercises. In-class assessments may also be given without warning on canvas (aka pop-assessments).

The number of readings covered by a particular quiz varies from 1-3, depending on the assigned readings in a week. Review the reading assignments before you attempt the quizzes! You must take quizzes online in Canvas at the beginning of class. Quiz questions are multiple choice, true/false and short-answer. Questions are randomly drawn from a larger pool by the Canvas system. Each quiz has approximately 5-10 questions. Quizzes are timed, and the time allotted for each quiz is proportional to the number of questions. Once you start a quiz in Canvas you must finish it in the allotted time—the "clock keeps ticking" in Canvas as soon as you open a quiz and only stops after the allotted time has passed. Quizzes must be completed before their closing date and time.

Weekly quizzes (including the Syllabus Quiz) are worth a total of 35 points (each question

is worth 0.5 - 1 point). In order to "make-up" a quiz, students must provide a legitimate, documented excuse for not completing the quiz on time. Access quizzes at the Module page in Canvas. Quizzes will be made available at the beginning of class and will remain open for 10 minutes.

Missed Quizzes can only be taken with instructor approval. To make up a missed semester quiz students must provide a legitimate, documented excuse as to why the exam was missed. Please make arrangements with the instructor ahead of time or immediately following a missed exam.

Assignments: There are approximately 6 assignments. This may change as the course progresses and content is covered or not covered.

Exam: There will be a mid-term and final exam that covers readings, class discussions and assignments.

Communication Policy: Your questions and comments are very important to me. I will strive to respond to all emails within 24 hours (48 hours over weekends and holidays).

Attendance and Assignment Make-up Policy:
Students are expected to attend and participate during the assigned class time. In-class assessments or quizzes that are missed due to missed class will be given zero points (unless a valid excuse is provided). Assignment due dates are listed in the syllabus. Assignments are due at the beginning of class. **Assignments can be turned in within 24 hours of the due date for 15% off, and 48 hours for 30% off. No late assignments will be accepted after 48 hours.**

Attendance points:
Attendance grades can be allocated for any class over the semester. Depending on the level of discussion, engagement and/or assessments during class attendance points will vary between 3 and 5 points, but point allocations may be higher than 5 pts during class days that are particularly rigorous. Some days may not receive an attendance grade. Therefore, attendance point allocation for a 15 week semester could vary from 0 pts up to 75 pts (or possibly more) depending on how I decide to allocate them.
We abide by the university attendance regulations. Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Extra Credit
There are no extra credit assignments planned for the course. However, extra credit may be offered at the discretion of the instructor.

Assignments & Grading:

- To motivate you to do the reading prior to class and to get you thinking about the topic, there will be **quizzes/assessments/ activities** throughout the

semester (in class); quizzes will cover assigned & lecture material for the week. Assessments and/or activities can be assigned as an out-of-class or in-class activity.

- Multiple **assignments** will be assigned throughout the semester; due dates are listed in the excel assignment table but are subject to change, please keep updated on Canvas). Detailed instructions for each assignment will be provided on Canvas.
- A **midterm and final exam** will be provided. These exams will cover class readings, in-class discussion and presentations and research projects.

Points and Final Grade (tentative; likely to change during semester):

	Points	**% of Total**
Quizzes (Approx. 7)	35 pts.	14.7% overall
Assignments (Approx. 4-5)	104 pts.	43.5% overall
Exam (Approx. 2)	60 pts.	25.1% overall
Activities (Approx. 8)	40 pts	16.7% overall
Total	239 pts.	100%

Letter grades will be assigned according to the following scale.

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
%	93-100	90-92.9	87-89.9	83-86.9	80-82.9	77-79.9	73-76.9	70-72.9	67-69.9	63-66.9	60-62.9	<60

Information on the UF grading policy for assigning grade points can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance and Make-Up Work

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Classroom demeanor and Professional conduct: This class will be conducted in an atmosphere of mutual respect and your active participation in class discussions is encouraged. Strongly differing opinions are encouraged and welcomed. The orderly questioning of the ideas of others, including mine, is similarly welcome. You should expect that if your conduct during class discussions seriously disrupts the atmosphere of mutual respect I expect in this class, you will not be permitted to participate further.

Electronic Device Policy: Students are permitted to use computers during class for note-taking and other class-related work only. Those using computers during class for work not related to that class must leave the classroom for the remainder of the class period. The use of cell phones, smart phones, or other mobile communication devices

is disruptive, and is therefore prohibited during class. Except in emergencies, those using such devices must leave the classroom for the remainder of the class period.

Academic Honesty: Students are expected to become familiar with and follow current University Policy (see http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/). On all work submitted for credit by students at the university, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office (Source: 2013-2014 Undergraduate Catalog). It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

Plagiarism: As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writing etc., which belong to another. In accordance with this definition: THE STUDENT IS COMMITTING PLAGARISM IF HE OR SHE COPIES THE WORK OF ANOTHER PERSON AND TURNS IT IN AS HIS OR HER OWN, EVEN IF PERMISSION BY THAT PERSON HAS BEEN GRANTED. Plagiarism will not be tolerated in this course. Offenders of this policy will be punished according to University policies. In addition, there will be no cheating of any type tolerated in this course. This policy will be vigorously upheld at all times in this course. http://web.uflib.ufl.edu/msl/07b/studentplagiarism.html, http://flexible.dce.ufl.edu/Data/Sites/39/media/uf-policy_student-conduct1.pdf

Software Use
All faculty, staff and students 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.

Campus Helping Resources
Students experiencing crises or personal problems that interfere with their general well-being are encouraged to use the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. University Counseling & Wellness Center, 3190 Radio Road, 352.392.1575, www.counseling.ufl.edu/cwc/. Resources are also available on campus for students lacking clear career or academic goals, which interfere with their academic performance. Career Resource Center, First Floor JWRU, 352.392.1601, www.crc.ufl.edu.

Students with Disabilities:
The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer

equipment, providing interpretation services and mediating faculty-student disability related issues. Room 001 Reid Hall, 352.392.8565, www.dso.ufl.edu/drc/.

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.

Course evaluation: Student assessment of instruction is an important part of efforts to improve teaching and learning. 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/.

Academic Resources Available:

E-learning technical support, 352-392-4357 (select opti on 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. https://career.ufl.edu/

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. http://writing.ufl.edu/writing-studio/

Student Complaints On-Campus: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

On-Line Students Complaints: http://distance.ufl.edu/student-complaint-process/

Extended outline of Course

The Ecology of Climate Change (WIS3410) is a course primarily focused on climate change science but also relates underlying processes and impacts of climate change to other dominant conservation fields such as habitat fragmentation, invasive species, and urbanization. The course covers in detail ecological principles and theory and uses activities and discussion, with an emphasis on the scientific process (observation, questions, data collection, analysis, and critique), as a means to better understand climate change science.

The course is designed around an integrative framework for assessing species vulnerability to climate change. The framework balances intrinsic (species sensitivity) versus extrinsic (exposure) factors. Intrinsic factors center around the ecology, physiology and genetic diversity of a species, which influences adaptive capacity and resilience to climate change whereas extrinsic factors center around species exposure to microhabitat/topographic buffering of climate as well as regional climatic change.

At the beginning of the semester each student will, without any knowledge of the framework or readings for support, construct their own framework (based on their current knowledge of ecology and common sense) for assessing species vulnerability to climate change for their chosen taxa. This framework will serve as the reference point for each student moving forward throughout the semester and will be adapted as knowledge is acquired.

We will then build on this understanding of the key components of the framework with a series of papers on observed impacts of climate change ranging from genetic diversity, phenotypic variation (morphology and physiology), phenology, distributions, population dynamics, community interactions, and ecosystem phase shifts. Students will also learn about general issues relating to scaling (both time and space) in ecology, biodiversity and climate gradients, thermal optimization curves, and species distribution and occupancy models, all of which are important concepts that support climate change science.

The short research activities are designed to help students integrate the theory they learned from academic articles into real-life scientific discovery. Importantly, by the end of each activity, students will have researched the key criteria of intrinsic and extrinsic factors from the integrated framework required for assessing species responses to climate change. At the beginning of each activity, students will form groups and each student group will plan and execute a small research project. Projects will tackle different sets of questions ranging from physiological tolerance to temperature, activity patterns within forest and urban environments as they relate to ambient versus operative temperature, and morphological traits that interact with climate. Throughout the course, students will peer-review each other's projects and provided constructive feedback for improvement.