WIS 6405 - Biodiversity

Linking biodiversity patterns and processes across scales of space and time
T 1:55-2:45 [CSEE221] & Th 12:50-2:45 [WEIM1064]
Fall 2024, 3 credits

Instructor: Dr. Morgan Ernest
Office Location: Building 150
Phone: 352-294-2082
Email (preferred mode of contact): skmorgane@ufl.edu
Website: skmorgane.github.io/biodiversity-course or Canvas
Office Hour: By appointment
Prerequisites: None

DESCRIPTION/ORGANIZATION

Biodiversity emerges from a combination of ecological and evolutionary processes operating across many scales of space and time. This course examines the concept of biodiversity and the processes that generate important patterns of biodiversity in ecology.

COURSE OBJECTIVES

- Define the dimensions of biodiversity through discussion and reading the primary literature
- Develop the ability to engage with biodiversity literature from different research areas
- Improve understanding of the processes that shape biodiversity
- Use the literature to assess current gaps in our scientific understanding of biodiversity
- Design and write an introduction communicating a gap in knowledge in the field of biodiversity

TEXT AND REQUIRED SUPPLIES

- There is not a required or recommended text book for this class
- Readings for this class come from journal articles available electronically through UF journal subscriptions. Links to papers are made available through the course website (skmorgane.github.io/biodiversity-course) or via links in Canvas modules.
- Computer with R and Rstudio installed. On specific days (noted on the course schedule) laptops or tablets will be required to participate in literature search and basic computational activities.
- Software: We will be using R (a freely available statistical programming environment) to learn about quantitative approaches to studying biodiversity patterns. R is required. It is

also recommending that student load RStudio – a freely available integrated programming environment – which makes working with R more user friendly.

COURSE POLICIES

Attendance Policy: Life is complicated and sometimes unpredictable. Given - well everything – the course attendance policy is very flexible with multiple ways to demonstrate engagement with course materials. Grading (see below) is structured so that students may have up to 2 excused absences without needing makeup work or having any impacts on grades. Excused absences must be consistent with university policies in the Graduate Catalog https://gradcatalog.ufl.edu/graduate/regulations/ and require appropriate documentation.

Additional missed discussions can be made up by providing written answers to the questions assigned for the readings for the day(s) missed.

Class Conduct: Because this course is discussion-based, an effective learning environment is critically dependent on all students feeling safe and supported in the classroom so that everyone feels comfortable engaging in discussion. I will do my best to foster an open and positive environment for all students but to achieve this I need students to engage in discussions in a constructive and positive manner and listen to other points of view with an open mind. It is okay to disagree with me or your classmates, and discussions on differing points of view are enthusiastically encouraged but must be done with empathy for the other people in the classroom. Sometimes we make mistakes during discussion because we did not think sufficiently about our word choice and that is okay. When this happens, students are expected to apologize sincerely to the affected person.

GENERAL COURSE STRUCTURE AND EXPECTATIONS

This course is designed to provide advanced training for graduate students in a specialized area of ecology. This course is a mixture of lecture, class discussion of primary literature, hands-on experience through class activities, and a major project. While there is some lecturing, class participation, intellectual engagement with topics, and discussion participation are the main ways students will learn in this class. The first hour of Tuesdays and Thursdays are devoted to lecture and class discussions. You are expected to come prepared to discuss the assigned papers. The second hour on Thursdays are devoted to either class activities or working on group projects.

Course Grading (200 points total)

50% (100 points) will be based on a class project and presentation, broken down as follows (given as percentage of course grade, not project grade)

- 10% (10 pts): Research Interests Discussion
- 10% (10 pts) Group Topic Assignment
- 10% (20 pts): Outline

- 30% (60 pts) Group Paper

50% will be based on class participation in discussion and class activities (100 pts)

- 21% (3 pts/class, 15 classes) Participation in "Share the Confusion" Canvas Discussions
- 21% (3 pts/class, 15 classes) Participation in Group Discussions, either during synchronous discussions or through submitted written (or recorded) answers to discussion questions.
- 8% (5 pts/R activity, 2 activities) R coding activities

Percent	Grade
90.0 - 100.0	A
87.0 - 89.9	A-
84.0 - 86.9	B+
81.0 – 83.9	B
78.0 - 80.9	B-
75.0 - 79.9	C+
72.0 – 74.9	C
69.0 - 71.9	C-
66.0 - 68.9	D+
63.0 - 65.9	D
60.0 - 62.9	D-
0 - 59.9	E

UF POLICIES

University Policy on Accommodating Students with Disabilities

The goal of the course is to create an environment where all students have an equivalent learning environment. If you need accommodations so that your opportunity to learn the material is equivalent to others, please do not hesitate to let me know. Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

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/evals. 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/.

University Policy on Academic Misconduct

Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at http://www.dso.ufl.edu/students.php.

Netiquette and Communication Courtesy

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. All in-person and electronic communications related to this course are covered by the course's code of conduct statement.

CAMPUS RESOURCES:

Health and Wellness

U Matter, We Care:
If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

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

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.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. https://teachingcenter.ufl.edu/.

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

Student Complaints Campus*:* https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

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

CLASS SCHEDULE

Cass schedule and links to any materials and assignments can be found on the Canvas Calendar and on the course home page in Canvas

Why Date	Topic	Assigned Articles
August 22	Welcome to Biodiversity	Syllabus
August 27	Taxonomic Diversity	Kraft et al 2011 "Disentangling the drivers of beta diversity along latitudinal and elevational gradients"
August 29	Alpha, Beta, Gamma Diversity w/ R	*Bring Computer*
Sep 3 & 5	Beyond taxonomy	Watch 1 video (links on canvas) • The Cultural Significance of Hawaiian Endangered Species • Macroecological networks • The Centipede's Sanctuary • The Biogeography of Native Botanical Diversity in the Age of Humans • How ancient DNA increases our understanding of species distribution and diversity
Sep 10	Phylogenetic and Functional Diversity	Wong et al 2018 "Comparing patterns of taxonomic, functional and phylogenetic diversity in reef coral communities" Petchey & Gaston 2002 "Functional diversity (FD), species richness and community composition"
Sep 12	Phylogenetic and Functional Diversity in R	*Bring Computer*
Sep 17	Local Processes: Niches and Filters	HilleRisLambers et al 2012 "Rethinking community assembly through the lens of coexistence theory" _____
Sep 19	Local Processes: Stochasticity and History _____ *Class Activity: Structure of an Introduction*	Chase 2007 "Drought mediates the importance of stochastic community assembly" _____ Watch How to Write a Compelling Introduction to Your Scientific Paper OR

		Read "How to write a good introduction. And tell if yours is bad" AND ONE of the following: Beta diversity patterns of bats in the Atlantic Forest: How does the scale of analysis affect the importance of spatial and environmental factors? Remote reefs and seamounts are the last refuges for marine predators across the Indo- Pacific Network structure of vertebrate scavenger assemblages at the global scale: drivers and ecosystem functioning implications
Sep 24	Patterns of Taxonomic, Phylogenetic, and Functional Diversity	DeVictor et al 2010 "Spatial mismatch and congruence between taxonomic, phylogenetic, and functional diversity"
Sep 26	Group Project: Forming research groups and picking research areas	Fill out the research ideas activity on canvas before class
Oct 1	Species Networks	Williams et al 2002 "Two degrees of separation in complex food webs" Gaiarsa & Guimaraes Jr. 2019 "Interaction strength promotes robustness against cascading effects in mutualistic networks"
Oct 3	Abundance Patterns _____ *Group Project: Topic Development*	McGill et al. 2007 "Species abundance distributions: moving beyond single prediction theories to integration within an ecological framework" Ter Steege et al 2013. "Hyperdominance in the Amazonian Tree Flora"
Oct 8	Regional Processes: Dispersal _____ *Group Project Work*	Leibold et al 2001. The metacommunity concept: a framework for multi-scale community ecology
Oct 15	Regional Processes: Environmental Heterogeneity	Ben-Hur & Kadmon 2019 "Heterogeneity-diversity relationships in sessile organisms: a unified framework"

Oct 17	Habitat Fragmentation _____ *Group Project: Develop topic*	Damschen et al 2019 "Ongoing accumulation of plant diversity through habitat connectivity in a long-term experiment"
Oct 22	Core-transient Species	Coyle et al 2013 "Opposing mechanisms drive richness patterns of core and transient bird species"
Oct 24	*Group Project: Topic Development*	Find and read articles on your topic
Oct 29	Biogeographic Processes: Earth History	Holt et al 2013. "An update of Wallace's zoogeographic regions of the world"
Oct 31	*Group Project: Revisiting Structure of an Introduction* *Work on outline*	Read "Writing a Research Paper Introduction | Step-by-Step Guide"
Nov 5	Biogeographic Processes: Evolution	Hazzi et al 2018 "Biogeographic regions and events of isolation and diversification of the endemic biota of the tropical Andes"
Nov 7	Group Project: Find the Gap	
Nov 12	Urbanization and Biodiversity	Hahs et al. "Urbanisation generates multiple trait syndromes for terrestrial animal taxa worldwide"
Nov 14	*Group Project: Understanding a Gap in Knowledge*	Dornelas et al 2014 "Assemblage time series reveal biodiversity change but not systematic loss"
Nov 19	Endemism	Sandel et al 2011 "The influence of late Quaternary climate-change velocity on species endemism"
Nov 21	*Group Project: Project Management – the End Game*	
Dec 3	What have we learned?	Kraft et al 2011 "Disentangling the drivers of beta diversity along latitudinal and elevational gradients"
Dec 11	Paper DUE	