

Stable Isotope Ecology

ZOO6927 Special Topics

Section 0221 (29596)

Spring 2022

3 credits

Class meeting times and locations

W | Period 4-5 (10:40 AM – 12:35 PM) Carr 222

F | Period 4 (10:40 AM – 11:30 AM) Carr 222

Instructor: Hannah Vander Zanden

Office: Carr 420

Phone: 352-294-0438

Email: hvz@ufl.edu

Office hours: W | 1:30 PM -2:30 PM and by appointment

Course objectives

This course is intended to expose students to the fundamentals of stable isotope ecology and biogeochemistry. We will examine carbon, nitrogen, hydrogen, oxygen, sulfur, and strontium isotope systematics and how they operate in various systems. By the end of the course, students should be able to:

- Explain fundamental isotopic principles that pertain to individual organisms, population, communities, ecosystems, and the globe
- How various techniques in stable isotope ecology can be used to address ecological questions
- How to interpret and manipulate isotopic data
- Critically evaluate the scientific literature

Format

- We will read and discuss approximately three full-length articles per week.
- Most journal article discussions will be led by students and some will be instructor-led
- Each discussion will begin with a brief presentation by the discussion leader(s) followed by question/answer.
- After the opening presentation, we will explore the paper more thoroughly, addressing the approaches applied and the implications of the study
- Some days, we will have in class activities that will require you to bring a personal laptop. I will note that on Canvas and provide reminders for those days that will require the use of a computer.

Textbook

There is no required textbook. Required readings will be from journal articles or other readings that you can download for free and will be posted to Canvas as PDF files.

Schedule of topics

Note, this may be subject to change. Please refer to the schedule on Canvas to see the latest version and link to the readings.

Week	Date	Topic	Isotopic system
1	5 Jan	Welcome	
	7 Jan	Introduction to isotopes, notation and measurement	All
2	12 Jan	Plant carbon and nitrogen	C/N
	14 Jan	Turnover rates in animals	All
3	19 Jan	Hydrological cycle	H/O
	21 Jan	Guest lecture	
4	26 Jan	Water in animals/humans	H/O
	28 Jan	Isoscapes and IsoMAP activity	H/O
5	2 Feb	Stable Isotope Lab Tour	All
	4 Feb	Guest lecture	
6	9 Feb	Animal migration (terrestrial)	H
	11 Feb	Ornithology collections visit	
7	16 Feb	Geographic assignment process, study design	All
	18 Feb	Bird Window Collision project introduction and planning	
8	23 Feb	Marine food webs	C/N
	25 Feb	Marine isoscapes	C/N
9	1 Mar	Niche metrics	C/N
	3 Mar	Animal migration (aquatic)	Sr
10	11 Mar	Spring break	
	13 Mar	Spring break	
	16 Mar	Mixing models	C/N
11	18 Mar	Stable isotope mixing models in R (simmr)	C/N
	23 Mar	Compound-specific AA	N
12	25 Mar	Compound-specific AA	C
	30 Mar	AssignR and data analysis day	
13	1 Apr	Food web H	H
	6 Apr	Topic of student interest	TBD
14	8 Apr	Bird project presentations	
	13 Apr	Climate signal in trees, plant water	O/C/N
15	15 Apr	Paleo isoscapes	C/N
	20 Apr	Topic of student interest	TBD

Course reserves

The following supplementary texts are available through Course Reserves. The electronic versions are linked directly through eLearning. Hard copies (indicated with *) are available in the Marson Science Library for two hour-overnight checkout. If you want a good reference for background reading on your own, a recommended text is Michener and Lajtha (2007)*. Other good compilations focus on isoscapes: West et al. (2010) or ecological change: Dawson and Siegwolf (2007). For a more specialized focus on animal migration: Hobson and Wassenaar (2019) or hydrology: Clark and Fritz (1997)*.

Reading assignments (4 points per article)

Carefully read each assigned paper. Expect to spend at least one hour per paper of careful reading and thinking. You are not expected to understand every detail, but you should aim to grasp the context.

For each assigned paper, you will need to bring your completed homework to class with four sections labeled as follows:

1. **Novelty/Importance.** What, if anything seems novel or important about this paper?
2. **Key figure.** Identify which figure is essential to summarizing the results of the paper and why you picked this figure.
3. **Understanding.** Are there any details or topics that you would like to learn more about or need help understanding?
4. **Class discussion.** Describe a topic or question related to the paper that you would like to discuss with the class.

Use your own words to write up the reading homework, and please do not quote any sources. Feel free to discuss the readings with other students outside of class, but the homework should represent your own thoughts.

Leading discussions

The goals of the presentation are to provide background that is useful to understand the isotopic system or process in the paper. Discussion leaders should not feel pressure to be able to answer every question or to understand all the technical details of the paper, and it is okay for discussion leaders to bring their own questions to the class. Presentations should not be longer than 10 minutes plus a few minutes for questions about the presentation. Following the Q/A, we will have a group discussion to explore the article(s) more deeply, including a critical evaluation of the conclusions and thinking about the importance of the paper more broadly.

Other assignments

Activities related to course topics that are not reading assignments will be assigned throughout the semester. Students will participate in a group-based project to analyze samples, interpret stable isotope data, and present results to the class. This semester's project will be based on bird window collisions. Follow the Canvas webpage for more details on directions and due dates.

Participation

Each day, I will take note of your presence (1 point per day) and your contributions to the discussion (2 points per day).

Grades

- **45% reading homework assignments** (drop lowest three scores)
- **20% leading discussions/presentations**
- **10% other assignments**
- **25% participation** (attendance and contributions to discussion, drop lowest two scores)

No explanations needed are needed for dropped scores. This arrangement is meant to allow you to take break when you need it or address unexpected life events.

Grade scale

A	≥ 92.5%
A-	≥ 89.5%
B+	≥ 86.5%
B	≥ 82.5%
B-	≥ 79.5%
C+	≥ 76.5%
C	≥ 72.5%
C-	≥ 69.5%
D+	≥ 66.5%
D	≥ 59.5%
D-	≥ 56.5%
E	< 56.5%

Grades will not be rounded; e.g., 89.50 is an A-, and 89.49 is a B+

Attendance policy

You are expected to attend class every day. Given the small class size, I will worry if you are not here! In general, acceptable reasons for absence from or failure to participate in class include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, professional conferences), military obligation, severe weather conditions, religious holidays, and participation in official university activities. Absences from class for court-imposed legal obligations (e.g., jury duty or subpoena) will be excused. Please contact me as soon as you realize you may be absent so that we can plan accordingly.

Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with me and discuss their access needs as early as possible in the semester.

Course evaluations

The evaluation period for this course will be open from April 9-22, 2022 and will not be viewable by faculty until after grades are due. 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 gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from

GatorEvals or in their Canvas course menu under GatorEvals. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

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 (sccr.dso.ufl.edu/process/student-conduct-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.

Campus resources

Asking for help is a sign of strength. Your well-being is important. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. The 24/7 crisis counselor is available at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that. In case of emergency, call 9-1-1.

Other resources available on-campus include:

- *Counseling & Wellness Center* (<http://www.counseling.ufl.edu/cwc/>, 352-392-1575) offers counseling services for depression, anxiety, and other mental health concerns. For Emergency Assistance, please see <https://counseling.ufl.edu/services/crisis/>.
- Many students experience stress and anxiety related to academic performance and college life. In addition to counseling services, the UF Counseling & Wellness Center provides self-help resources that you may find helpful: <https://counseling.ufl.edu/resources/online/>.
- *Student Health Care Center* Call 352-392-1161 for 24/7 information to help you find the care you need or visit <http://shcc.ufl.edu/>.
- *Career Resource Center* (<http://www.crc.ufl.edu/>, Reitz Union, Suit 1300, 352-392-1601) offers career and job search services.
- *The Pantry* is a resource to visit for any student who has food insecurity: <https://pantry.fieldandfork.ufl.edu/>
- Any student who lacks a safe and stable place to live, and believes this may affect their performance in the course is urged to contact the Dean of Students for support.
- *GatorWell Health Promotion Services*: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

In-class recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, 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 “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. 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.