

Biodiversity: Patterns and Processes
ENSC 295, Fall 2016

Where: Rowell 102

When: Tu/Th, 2:50-4:05

Instructors: Keri Watson, Charlie Nicholson & Taylor Ricketts

Office: Gund Institute, Johnson House, 617 Main Street

Office hours: Monday 2:00 – 3:00 & Tuesday 10:00 – 11:30

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Welcome to *Biodiversity: Patterns and Processes*. This course will consider changes in the diversity of life forms through time and across space, as well as the ecological and evolutionary drivers behind these patterns. Biodiversity research has risen in importance as ecologists continue to recognize how the variety of life underpins many critical ecosystem functions. For this reason the questions ‘*Why are there so many species?*’ and ‘*Where do these species occur?*’ remain at the forefront of contemporary ecology, evolution and biogeography research. We will discuss patterns in the diversity of life throughout earth’s history. This will place in context our current biodiversity crisis; species are becoming extinct at 100 to 1,000 times normal extinction rates. What are the consequences of this diversity loss? What do we need to know to halt this collapse of life on earth? Understanding biodiversity patterns and processes is will help us understand how we might better coexist on this crowded planet.

Learning Objectives

At the end of this course, students will be able to:

- describe the foundational concepts and theories related to biodiversity research
- discuss the scientific debate that surrounds many of these concepts and theories
- apply biodiversity concepts and tools to conservation and management
- use software to understand how we measure biodiversity

Expectations

To make the semester go smoothly for all, it’s worth being clear about our expectations of students. Please:

- Attend every class. If you must miss class, tell us ahead of time.
- Participate in class. We will ask lots of questions. That means you need to read and understand the assignments ahead of time, and be ready to contribute in class.
- Turn in assignments on time. We will deduct 10% from the score for each day an assignment is late.
- Silence your phone and put it away. We all need your full attention.

Readings

Our understanding of biodiversity is advanced by work in academic journals, books, popular magazines, podcasts, and videos. We will read, watch and listen to many of these, but we will focus on peer-reviewed journal articles because they capture the language and progress of biodiversity science.

Book chapters and articles will be posted on the Blackboard site. We will read excerpts from a few new and classic books, including:

- *The Sixth Extinction* Elizabeth Kolbert (2014)
- *Biodiversity: An Introduction* Kevin J. Gaston and John I Spicer (2004)
- *The Diversity of Life* E. O. Wilson (1992)

Grading

A large portion of your final grade will come from two exams. In addition there are quizzes, labs, and group discussions/presentations. The break down is as follows:

- Class Participation and preparation – 10%
- Quizzes (5) – 20%
- Labs (3) – 30%
- Midterm exam – 20%
- Final exam – 20%

Exams will cover material from lectures, labs, scientific papers, and readings. The final exam will cover material from the entire semester.

Sources of course material

This course is built in part from material published or graciously shared by several scientists. We are grateful to:

- Terri Donovan, Jed Murdoch and Michael Donovan at UVM
- David Haskell at the University of the South

Academic Integrity

Offenses against the Code of Academic Integrity are deemed serious and insult the integrity of the entire academic community. Any suspected violations of the Code are taken very seriously and will be forwarded to the Center for Student Ethics & Standards for further intervention. To read the Code of Academic Integrity and learn more about the Center for Student Ethics and Standards, visit their website at: <http://www.uvm.edu/cses/?Page=ah.html&SM=ahmenu.html>

Course Schedule

This is subject to change – check the Blackboard site to stay up to date

Section	Date	Day	Topic	Instructor
	30-Aug	T	Intro	ALL
	1-Sep	Th	Why is BD important?	THR
BIODIVERSITY: MEANINGS & MEASURES				
	6-Sep	T	Definitions & Taxonomy	KBW
	8-Sep	Th	Species Concepts	CCN
	13-Sep	T	Biodiversity Measures	KBW
	15-Sep	Th	Species Area Relationships	CCN
	20-Sep	T	LAB: SAC/Rarefaction	ALL
PROCESSES OF BIODIVERSITY				
	22-Sep	Th	Evolution	CCN
	27-Sep	T	Speciation	KBW
	29-Sep	Th	Phylogeny	KBW

	4-Oct	T	Extinction	CCN
PATTERNS OF BIODIVERSITY IN SPACE				
	6-Oct	Th	Island biogeography	CCN
	11-Oct	T	Island BioGeo lab	ALL
	13-Oct	Th	Abiotic drivers of biodiversity patterns	KBW
	18-Oct	T	Biotic drivers of biodiversity patterns	CCN
	20-Oct	Th	Latitudinal gradients	KBW
	25-Oct	T	EXAM	CCN
	27-Oct	Th	Conservation I	THR
PATTERNS OF BIODIVERSITY IN TIME				
	1-Nov	T	Paleobiodiversity	CCN
	3-Nov	Th	Mass Extinction	CCN
	8-Nov	T	Adaptive Radiation	KBW
	10-Nov	Th	Traceback Lab	ALL
	15-Nov	T	Background extinction rates	KBW
THE BIODIVERSITY CRISIS				
	17-Nov	Th	6th mass extinction	CCN
	22-Nov	T	BREAK	
	24-Nov	Th	BREAK	
	29-Nov	T	Today's threats	KBW
	1-Dec	Th	Ethical arguments for biodiversity	KBW
	6-Dec	T	Practical arguments for biodiversity	CCN
	8-Dec	Th	Conservation II	THR
	15-Dec	Th	EXAM (10:30am, Rowell 102)	ALL