

Deep-Sea Biology

Bio 462

Kevin A. Zelnio

Spring 2011

Contact Information

Kevin A. Zelnio

Email: kaz3869@uncw.edu

Office Hours: Hours TBA in the library, or by appointment.

I will respond to email as soon as possible, but please allow 24 hours for a response.

Course Description

Welcome to the Spring 2011 Deep-Sea Biology course at UNCW! This semester we will take an integrative approach towards understanding the Deep Sea. It is my hope that you not only come out this course with an appreciation for the history, biology, adaptations and unique habitats that make up Earth's largest environment, but to appreciate this as case-study in how we can understand a system using a multidisciplinary approach. While we will focus on biological aspects of the Deep Sea, we cannot understand without more than a passing familiarity with geology, chemistry, physics, history and sociology.

The course is divided into 4 sections: Exploration and Processes, Biology in the Deep Sea, Deep Sea Habitats, Humans and the Deep Sea. Each section will guide you through understanding Deep-Sea Biology as a case study for an integrative approach to learning. Finally, we will end the course exploring the how humans have affected one of the environments furthest from our reach

About your instructor: I have worked in the deep-sea environment for 8 years, gone on several large oceanographic expeditions and dove as deep as 2500 meters in submersibles. My previous research concerned studying the biodiversity, community ecology and population genetics of deep-sea chemosynthetic-based environments such as hydrothermal vents and methane seeps. Additionally, I have described 5 species of shrimp and anemones from these unique underwater volcanoes. Furthermore, I am very active in the online science community and am a freelance writer and scientist, and Assistant Editor at Deep Sea News. At UNCW I am studying natural hybridizing populations and population genetics of marine animals (and pitcher plants!).

Course Time and Location

Class Meetings: Monday, Wednesday, and Friday 12:00 to 12:50 pm Dobo Hall 103

Course Website: <http://www.zelnio.org/teaching/>

Texts and Readings

You should get Tony Koslow's *The Silent Deep*. I did not order the book through the UNCW Bookstore because it is nearly half the price on Amazon and other online retailers. The last I saw on Amazon (<http://www.amazon.com/Silent-Deep-Discovery-Ecology-Conservation/dp/0226451259>) used copies were as low as \$10 and new copies were around \$20 for the paperback and \$25 for the hard cover. If you are on a scholarship that requires you to

purchase books only via the campus bookstore, let me know and I'll try to make arrangements. I will also have a copy on reserve at the Library. I think you will enjoy Koslow's book, it is a good overview for the topics we will explore in greater detail in the lectures and is a nicely illustrated read.

There will be many additional reading from the primary literature and popular science articles. I will make them available for download as pdf files (Adobe Reader is a freely available pdf reader <http://get.adobe.com/reader>).

Course Goals

During your time in Bio 462 I would like to expose you to life in the deep sea. I hope you walk away from the class with an appreciation of how surface and benthic processes are linked, how life adapts to unique physical environments, how studying the ocean requires a multidisciplinary toolkit, and how our actions as human on this planet affect an environment very alien and very distant to ours. Most will not be marine biologists, but I will have done my job as an educator if you have gained a lifelong passion or appreciation of the ocean, its denizens, and how are a part of it all.

Course Assessment

There are three midterms that are multiple choices at the end of the first three sections. Each midterm exam is 25% of your grade. The final exam will be an in class short essay format, and be worth 25% of your grade.

Midterm 1 – February 11	25%
Midterm 2 – March 11	25%
Midterm 3 – April 20	25%
Final Exam – May 6 11:30-2:30pm	25%

	100%

There are absolutely NO MAKE UP exams unless you have an official note from a doctor, for a funeral, or an official note for a prescheduled sporting event. In which case YOU MUST schedule to take the midterm exam ahead of time with me. There are too many students in the course to make individual exceptions and I will only official UNCW excuses and the proper official notation for the absence.

Academic Integrity

I take academic integrity VERY seriously. UNCW has an ACADEMIC HONOR CODE that you should all make sure you are familiar with if you haven't already:

<http://uncw.edu/stuaff/odos/honorcode/>. For instructors, UNCW makes it very easy to report suspected infringements against academic integrity (form is available online <http://appserv01.uncw.edu/SelectSurveyNET/TakeSurvey.aspx?SurveyID=n4K2753K>). Cheating on an exam results in an automatic F for that exam.

Course Schedule

This is a general guideline. For the most up-to-date schedule see the class website.

		SECTION I: History and Processes	
January	12	Introduction to Class/What is the deep sea	
	14	<i>AWAY AT CONFERENCE NO CLASS</i>	
	17	<i>MLK DAY NO CLASSES</i>	
	19	History of Deep Sea Exploration I: Major people and expeditions	
	21	History of Deep Sea Exploration II: Sampling in the Deep	
	24	Geology of the Deep-Sea Floor	
	26	Chemistry of the Deep-Sea	
	28	Hydrodynamics of the Deep-Sea Floor	
	31	Carbon Cycling and Benthic-Pelagic Coupling	
	February	2	Midwater and Seafloor Microbial Ecology
4		Organisms of the Deep-Sea: Open Water	
7		Organisms of the Deep-Sea: The Benthos	
9		Catch Up and Review	
11		MIDTERM 1	
		SECTION II: Biology in the Deep Sea	
14		Physiological and Biochemical Adaptations	
16		Sex and Seasonality in the Sea	
18		Larval Dispersal	
21		Bioluminescence and Visual Ecology	
23	Nutrients and Food Sources		
25	Feeding Ecology and Adaptations		
28	Symbioses		
March	2	Animal Sediment Relationships	
	4	Body Size	
	7	Patterns in Biomass and Abundance	
	9	Catch Up and Review	
	11	MIDTERM 2	
	14	<i>Spring Break NO CLASSES</i>	
	16	<i>Spring Break NO CLASSES</i>	
	18	<i>Spring Break NO CLASSES</i>	
			SECTION III: Deep-Sea Habitats
	21	Introduction to Deep-Sea Habitats	
23	Shelf and Slope		
25	Abyssal Plains		
28	Seamounts, Trenches and other Hard Substrata		
30	Coral and Sponge Reefs		

- April
- 1 Hydrothermal Vents: Ecology, Biogeography
 - 4 Hydrothermal Vents: Adaptations to an Extreme Environment
 - 6 Methane Seeps and Mud Volcanoes
 - 8 Whale and Wood Falls, OMZs
 - 11 Patterns in Biodiversity
 - 13 Biogeography and Paleobiology
 - 15 Evolution and Origin of the Deep Sea Fauna
 - 18 Catch up and Review
 - 20 MIDTERM 3
 - 22 ***Good Friday NO CLASSES***
 - SECTION IV: Humans and the Deep Sea**
 - 25 Climate Change and Pollution
 - 27 Economic Interests
 - 29 Law of the Sea and Our future in the Ocean
- May
- 2 Everyone Is a Stakeholder, Evaluations and Closing Comments
 - 6 **FINAL EXAM 11:30-2:30pm**