PCB6675C, BOT6935, ZOO6927 Evolutionary Biogeography – Spring 2014

Credits: 3
Schedule: Wednesdays and Fridays, 4th & 5th Period (10:40 am - 12:35 pm)
Location: Carr 221

Instructors
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Office hours

By appointment or drop by office

Prerequisites

Biogeography is a broad field and a multi-disciplinary approach is essential. There are thus no prerequisites other than a keen interest in ecology, evolution and diversity and willingness to participate actively in classes.

Course description

Biogeography is the study of geographic patterns in distribution, diversity and abundance, and is an exciting and rapidly evolving field, integrating systematics, ecology and evolution with geography, geology and climatology. The course will provide a broad introduction to topics and methods in both historical and ecological biogeography, and will teach students how to interpret biological datasets in a geographical context. The first half of the course considers the interactions between a dynamic Earth and evolving life, and examines the distribution of organisms and the role of geological processes in speciation. The second half of the course focuses on large-scale ecological patterns, including diversity gradients, island biogeography, and the relationship between range-size and abundance. The course will conclude by considering

the implications and practical applications of ecological biogeography in biodiversity conservation.

Objectives and basis for grading

Lectures

Lectures will provide an overview of major topics in biogeography. Students will be introduced to a broad variety of methods and will learn the most common empirical patterns. Papers or book chapters will be suggested as background reading in preparation for each lecture.

Lab

Lab consists of discussions of selected papers and some practical exercises. Each week students will be set papers drawn from both classical and contemporary literature. One student will be selected each class to lead the discussion of set papers, but all students are expected to contribute in class and part of the overall grade will reflect this contribution. Students will learn to read papers on biogeography with a critical mind, assessing whether study taxa and methods are appropriate for the hypothesis that is being tested, and considering whether results and conclusions are adequately supported by the data and analysis.

Exams

One mid-term exam and one final exam will test the student's understanding of course topics, as covered by lectures, in assigned reading and in discussions.

Grading

% by activity

Activity	% of final grade
Mid-term and Final exam	70
Class participation	30

A = 95-100%
A- = 90-94%
B = 85-89%
B- = 80-84%
C = 75-79%
C- = 70-74%
D = 65-69%
D- = 60-64%
E = <60%

Assignments and attendance policy

Attendance at class and seminars is expected, and students should be prepared to justify absences. Frequent absences will certainly result in the student being less able to effectively answer exam questions. No make-up exams will be given unless exceptional circumstances arise.

Course textbook : No textbook required. Readings will be provided.

COURSE OUTLINE

The schedule below may be subject to slight changes.

WEEK 1
January 8   Introduction to Biogeography (scope of field, history of development)
                  LAB
January 10   Earth history (geological times, plate tectonics)
                  Basic systematics principles, evolution, and speciation

WEEK 2
January 15   Significant Disjunctions
                  Origin and Biogeography of Palaeoflora (Steve Manchester)
January 17   Significant Disjunctions
                  Origin and Biogeography of Palaeofauna (Jon Bloch)

WEEK 3
January 22   Biogeographic processes (vicariance, dispersal, endemism and extinction)
                  LAB
January 24   Historical Biogeography Methods 1 (Centers of origin and Phylogenetic
                  biogeography)
                  LAB

WEEK 4
January 29   Historical Biogeography Methods 2 (Ancestral area reconstruction: Bremer,
                  Ronquist, Hausdorf)
                  LAB
January 31   Historical Biogeography Methods 3 (Panbiogeography and Cladistic biogeography)
                  LAB

WEEK 5
February 5   Historical Biogeography Methods 4 (Parsimony Analysis of Endemicity (PAE)
                  LAB
February 7   Historical Biogeography Methods 5 (Event-based methods)
                  LAB

WEEK 6
February 12 Historical Biogeography Methods 6 (Integrative approaches: Maximum Likelihood
and Bayesian approaches)
LAB
February 14 Historical Biogeography Methods 7 (Integrative approaches: fossils and tree
calibration)
LAB

WEEK 7
February 19 Species richness and diversity 1 (measuring species richness, accumulation curves,
estimators, range-map vs survey richness)
LAB
February 21 Species richness and diversity 2 (global patterns of species richness, elevational and
latitudinal gradients)
LAB

WEEK 8
February 26 Human Biogeography (Bill Keegan)
LAB
February 28 **Mid-term Exam**

WEEK 9
SPRING BREAK

WEEK 10
March 12 Species richness and diversity 3 (null models of species richness, spatial
autocorrelation)
LAB
March 14 Species richness and diversity 4 (hypotheses for richness gradients: climate, energy,
Rapoport rescue effect, stability, speciation rate)
LAB

WEEK11
March 19 Island Biogeography 1 (introduction, oceanic vs continental islands, characteristics
of island faunas, island biogeography of bird faunas, island extinctions)
LAB
March 21 Island Biogeography 2 (equilibrium theory, adaptive radiation)
LAB

WEEK 12
March 26 Island Biogeography 3 (species-area relationship: overview)
LAB

March 28   Island Biogeography 4 (species-area relationship: identifying causes, importance of
             scale)
             LAB

WEEK 13
April 2   Macroecology 1 (rarity and its spatial variation)
             LAB
April 4   Macroecology 2 (relationships among range size, occupancy and abundance)
             LAB

WEEK 14
April 9   Conservation 1 (measures of biodiversity, phylogenetic diversity vs species
             diversity, indicator concept)
             LAB
April 11   Conservation 2 (prioritization, hotspots, complementarity methods)
             LAB

WEEK 15
April 16   Conservation 3 (predicting extinction from habitat loss, reserve design)
             LAB
April 18   Climate change
             LAB

WEEK 16
April 23   **Final Exam**

Class Demeanor Expected by Instructor: Students should be considerate, polite, open-minded, objective and show interest in the work of others. UF rules prohibit having food or drinks in classrooms. Use of tobacco products (in any form) in the classroom is prohibited.

Additional General Information: The following information applies to all courses at the University of Florida.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standard of honesty and integrity.

Academic Honesty: As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

Copyrighted Materials and Software Use: All students are required and expected to obey the laws and legal agreements governing copyrighted material and 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.

Accommodations for Students with Disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

University Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling; and
4. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.