

## Biogeography

GEOG/BIOS 3160/5160 [7556/6228, 7557/6229]

Spring 2023-2024

MWF 9:40-10:35

Tupper Hall 104

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Office Hours: M&W 1-3 pm

- Office hours are available in-person, or via Teams (“Dyer Office Hours Spring 23-24”). I’ll assume in-person unless you let me know otherwise.
- Contact information is also available on Blackboard.

Our goal in this course is to understand the spatial patterns of plant and animal distributions. To achieve this goal, we will examine the historical (*speciation, migration, dispersal*), environmental (*climate, soils, topography*) and biotic (*competition, resource partitioning*) influences behind these patterns. We will also explore the role of disturbance as a shaper of biological communities. Along the way, you will be introduced to field, laboratory and statistical means of analyzing ecological data. As you develop an understanding of how and why biological diversity varies over the surface of the Earth, you can appreciate the role of human activities in altering biogeographic patterns.

### Readings:

Copies of the readings (pdf format) will be placed on Blackboard. These will be drawn primarily from two textbooks:

*Biogeography: Space, Time and Life*, MacDonald, 2003.

*Biogeography: Biological Diversity across Space and Time* (5<sup>th</sup> ed.), Lomolino, Riddle & Whittaker, 2017.

### Grading (Refer to schedule on last page for important dates)

- There will be three exams throughout the semester, including a non-cumulative exam during finals week; each will be worth 75 points. The format of the exams will be primarily short essay, but will also include terminology identification, and definitional fill-ins.
- In addition to exams, students will write a scientific research paper, worth 100 points, based on a class field experience focused on Hemlock Woolly Adelgid, and invasive species recently established in Ohio. Guidelines are provided on a separate handout.
- Several activities and assignments (approximately 6-8) related to the week’s topic will contribute to your final grade. They usually involve the interpretation of data, and are intended to drive home concepts from lecture. These activities provide an opportunity to earn points (most are worth 5 points) through processing what we’ve learned. It is expected that they will engage conversations as you are working on them! Ask questions! *Note: these are intended as in-class activities, and make-ups are not permitted unless you have prior permission from me, or a validated excuse for your absence.*
- Graduate students will respond to an additional question on the final exam based on supplemental readings (as indicated in the schedule on the last page). They will be held to a higher standard on exams and with their written assignments, and also will be required to synthesize more literature (number of references) for their paper.
- Grades will be based on total points earned, as a percentage of points available from exams, writing assignment, and activities. It is a good practice for all students to save graded and returned assignments until final course grades are assigned.

### Grading scale:

| A       | A-    | B+    | B     | B-    | C+    | C     | C-    | D+    | D     | D-    | F   |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| 93-100% | 90-92 | 87-89 | 83-86 | 80-82 | 77-79 | 73-76 | 70-72 | 67-69 | 63-66 | 60-62 | ≤59 |

### Special Circumstances

If you are unable to participate in the course during the semester for a legitimate reason (e.g., illness, death in your immediate family, religious observance, jury duty, required military reserve training, involvement in University-sponsored activities), notify me ASAP about making up the missed material. (Note: misrepresenting your reasons for missing course activities constitutes academic dishonesty; see paragraph below.) Barring extraordinary circumstances, students should contact me about missed activities before the next class period.

Any student who suspects s/he may need a disability-based accommodation should contact me privately to discuss specific needs, and provide me written documentation from the Office of Student Accessibility Services. If you are not yet registered as a student with a disability, you should contact that office.

⚡ Cheating and plagiarism are dishonest and unethical. Academic dishonesty will not be tolerated in this class, and anyone caught cheating will receive a zero for the assignment. Academic dishonesty includes (but is not limited to) sharing answers on graded assignments, misrepresenting your reason for a missed coursework, presenting another person's work as your own, or using advantages not approved by the instructor. Cases of academic misconduct may also be reported to the Office of Community Standards and Student Responsibility, which may impose additional sanctions. (Students may appeal any academic sanctions through the grade appeal process.)

### Course Expectations

#### Instructor:

- Listen and respond to student questions and concerns
- Have reasonable demands on work outside of class time
- Be available for assistance outside of class time
- Apply consistent and fair grading criteria
- Provide useful and timely feedback on student work
- Through the presentation of material and activities, provide an atmosphere that facilitates learning, critical thinking, and intellectual growth

#### Student:

- Show up to class and be on time
- Ask the instructor to clarify material that is unclear
- Monitor your "ohio.edu" e-mail for correspondence related to the course, and respond as necessary in a timely manner
- Work to your potential, and turn in your best work.
- Complete all assignments

*Seventy percent of success in life is showing up - Woody Allen.* **Attendance is expected.** Although not a basis for student grades, good attendance is essential for success in this class. (It is essential to earn credit for in-class activities.) If any topic is unclear after lecture, please do not hesitate to see me as soon as possible, individually or in a group. Feel free to e-mail me with questions as well (please include a relevant subject line, and sign your name at the end of your message). Please note, I do not give out copies of my lecture notes. If you miss class, you will need to get notes from a fellow student. You are encouraged to contact me before the next class so that I can tell you what we covered.

*Classroom etiquette:* It is disruptive to arrive late, or to get up and leave while class is still in session. If for some reason you can't get to class on time or must leave early, please inform me beforehand. **Unless special arrangements are made with me in advance**, laptop computers are not permitted during class. Focus on this class for 55 minutes: turn off your cell phones and stow them away during class.

### TENTATIVE LECTURE AND READING SCHEDULE (Subject to change)

| Week<br>(beginning)            | Topic:  | Readings:<br><i>L=Lomolino, M=MacDonald</i><br>(color-coded to topics)  |
|--------------------------------|---|---|
| <b>Week 1</b><br>(Jan. 17 [W]) | Course overview.<br><b><u>I. HISTORICAL BIOGEOGRAPHY:</u></b><br><b><i>Broad Spatial Scales &amp; Long Time Frames</i></b><br>Evolution and natural selection   | L – Chapter 1<br>Background: M – Chapter 2, pp. 9-22<br>M – Chapter 9, pp. 262-272  |
| <b>Week 2</b><br>(Jan. 22)     | Speciation & extinction   | M – Chapter 9, pp. 272-296  |
| <b>Week 3</b><br>(Jan. 29)     | Endemism; biogeographical dispersal & distributions   | M – Chapter 8   |
| <b>Week 4</b><br>(Feb. 5)      | Introduction to “paleobiogeography;” continental drifting, climate change, and biogeographical regions  | L – Chapter 8, pp. 244-254 <sup>†</sup> ;<br>M – Chapter 10   |
| <b>Week 5</b><br>(Feb. 12)     | Biogeographic patterns in the Quaternary<br><b>Saturday (2/17) Field Trip to Hocking Hills</b>  | L – Chapter 9   |
| <b>Week 6</b><br>(Feb. 19)     | <b>Exam 1</b> Wednesday Feb 22 (through “Quaternary” [week 5])<br><b><u>II. ECOLOGICAL BIOGEOGRAPHY: Interactions between</u></b><br><b><i>species and their environments, now and in the recent past</i></b><br>Limiting Factors & controls on species ranges. | L – Chapter 4, pp. 71-90  |
| <b>Week 7</b><br>(Feb. 26)     | The physical environment: macroclimate; The physical environment: environmental gradients. Ordination.  | Background: M – Chapter 2, pp. 22-35  |
| <b>Week 8</b><br>(Mar. 4)      | The physical environment: soils   | <i>[continues earlier readings]</i>   |
| Spring Break March 10-16       |   |   |
| <b>Week 9</b><br>(Mar. 18)     | Biotic interactions (competition in zoogeography)<br>Disturbance  | L – Chapter 4, pp. 92-100<br>M – Chapter 5  |
| <b>Week 10</b><br>(Mar. 25)    | Succession  | <i>[no new readings]</i>  |
| <b>Week 11</b><br>(Apr. 1)     | <b>Exam 2</b> Monday Apr 1 (“Ecological Biogeography” through “Disturbance” [weeks 6-9])  | Graduate students: <i>Fire in the EDF</i> (Matlack, Staumbagh readings)   |
| <b>Week 12</b><br>(Apr. 8)     | Changes to the Eastern Deciduous Forest since settlement  | <i>[no new readings]</i>  |
| <b>Week 13</b><br>(Apr. 15)    | <b><u>III. BIOGEOGRAPHY, CONSERVATION, AND LANDSCAPE</u></b><br><b><u>ECOLOGY</u></b><br>Island Biogeography Theory & beyond  | M – Chapter 14, pp. 428-447<br>Graduate students: <i>Habitat fragmentation and diversity</i> (Fahrig, Fletcher readings)<br>M – Chapter 14, pp. 428-447 |
| <b>Week 14</b><br>(Apr. 22)    | Climate change<br>Writing Assignments due Friday (4/26)   | <i>[no new readings]</i>  |

<sup>†</sup>Lomolino’s Chapter 8 provides extensive background on the history and mechanisms of plate tectonics, and you are encouraged to read these sections briefly for background. The assigned reading focuses more on the past configurations of the continents.

### **FINAL EXAM: Friday, May 3<sup>rd</sup> 1:00-3:00 pm**

Non-cumulative, covering the material “Succession” through “Climate Change” [weeks 10-14]