Welcome to Geography/Botany 338: Environmental Biogeography
Fall 2018

Schedule: Monday & Wednesday 2:30-3:45 pm, Humanities 1641
Credits: 3
Instructor: Professor Ken Keefover-Ring
Email: ken.keefoverring@wisc.edu
Office: Science Hall 115C
Office Hours: Tuesday 3:00-4:00 pm & Wednesday 12:00-1:00 pm or by appointment

Note: This course fulfills the Biological Science breadth requirement.

Course Description:
This course takes an ecosystems approach to understand how physical -- climate, geologic history, soils -- and biological -- physiology, evolution, extinction, dispersal, competition, predation -- factors interact to affect the past, present and future distribution of terrestrial biomes and all levels of biodiversity: ecosystems, species and genes. A particular focus will be placed on the role of disturbance and to recent human-driven climatic and land-cover changes and biological invasions on differences in historical and current distributions of global biodiversity.

Course Goals:
- To learn patterns and mechanisms of local to global gene, species, ecosystem and biome distributions
- To learn how past, current and future environmental change affect biogeography
- To learn how humans affect geographic patterns of biodiversity
- To learn how to apply concepts from biogeography to current environmental problems
- To learn how to read and interpret the primary literature, that is, scientific articles in peer-reviewed journals.

Course Policy:
I expect you to attend all lectures and come prepared to participate in discussion. I will take attendance. Please let me know if you need to miss three or more lectures. Please respect your fellow students, professor, and guest speakers and turn off the ringers on your cell phones and refrain from texting during class time. Non-class-related internet or computer use is not allowed during the class period. It is distracting to your fellow students.

Required Reading: All readings will be posted as PDFs on Canvas
- Selected research articles and book chapters as posted on Canvas

Evaluation:
Final letter grade is based on a percentage of points you earn out of a possible 200.
Exam 1: 40 points (~21% of your grade)
Exam 2: 40 points (~21%)
Exam 3: 40 points (~21%)
Paper Outline: 5 points (~2.6%)
Term Paper: 40 points (~21%)
Peer-Review: 5 points (~2.6%)
Group presentations and participation during in-class discussions: 20 points (~10.5%)
There will be no extra credit.

**EXAMS:**

Exams will cover material from lectures, assigned readings, and in-class discussion and will consist of multiple choice, definition, short answer, and essay questions designed to gauge the extent students have acquired a basic literacy in biogeographical concepts. The third exam will predominantly focus on the last third of the course material, but students should be aware that the topics in biogeography build upon each other and so links to materials in previous lectures will be expected. **There is no exam during finals week.**

**TERM PAPER:**

All paper topics should be approved by the instructor. Papers will be peer-reviewed by one of your classmates before final submission. Instructions will be provided when paper topics are due. All submissions are to be word-processed in 12-point font, double-spaced, left-justified and uploaded on the Canvas website. Provide citations for all data and arguments that are not your own. In scientific articles, it is usual practice to paraphrase results or conclusions from other articles as long as the exact wording is not copied and the original authors are given proper credit. The use of direct quotations is very uncommon unless the exact wording is necessary to prove a point. Please see separate paper instructions document.

**UNDERGRADUATE STUDENTS:**
Write a 6-page paper on the biogeography of a particular species, genus or family, and provide its current and historical patterns and mechanisms of distribution, conservation status, and life history (including important biological interactions and environmental requirements).

**GRADUATE STUDENTS:**
Write a 12-page paper on a controversy in Biogeography and state the problem, trace its origins in the literature, provide arguments on opposing sides from the peer-reviewed literature, and what implications it has on current thinking and practice in conservation or sustainable use.

**Suggested Journals with Biogeographic Content:**
Ecography; Journal of Biogeography; Diversity and Distributions; Global Ecology and Biogeography; Progress in Physical Geography; Global Change Biology; Proceedings of the National Academy of Sciences; Nature; Science; Trends in Ecology & Evolution; Conservation Biology; American Naturalist; Annual Reviews in Ecology and Systematics; Biodiversity and Conservation; Biological Journal of the Linnean Society; Ecology; Ecological Applications; Molecular Ecology

**Tips on How to Read a Scientific Paper**
www.biochem.arizona.edu/classes/bioc568/papers.htm
www.bio.unc.edu/faculty/Khogan/HowToReadAScientificPaper.ppt
**PARTICIPATION:**

I encourage in-class discussions of the lecture material and readings. Most class periods will consist of a 50 minute lecture and 25 minute discussion. In order to make this as productive and enjoyable as possible, I expect everybody to participate. Thus, you need to have read the papers ahead of time, bring questions, and complete assignments as given. On those days that we discuss a reading, each student must come prepared to share an opening discussion statement about the reading.

**QUESTIONS:**

Students who ask questions tend to be able to build connections between course topics and fare better on exams. I am happy to entertain questions during lectures. At the beginning of each class period I will devote time for questions on any material from previous lectures. I will also answer questions submitted by email and on the Canvas course discussion board. I expect you to let me know if any of the material is confusing either in person before or after class, by email, or in my office hours. Feedback is welcome at any time.

**ACADEMIC INTEGRITY:**

Academic honesty requires that the course work (drafts, reports, exams, papers) a student presents to an instructor honestly and accurately indicates the student’s own academic efforts. Please review the university’s guidelines on proper conduct: [http://students.wisc.edu/saja/misconduct/UWS14.html](http://students.wisc.edu/saja/misconduct/UWS14.html)

Some examples of academic misconduct (from the website) include: cutting and pasting text from articles or from the web without quotation marks or proper citation and paraphrasing from the web without crediting the source. When in doubt about how to properly cite something, come talk to me.

**RESOURCES FOR STUDENTS:**

- **McBurney Disability Resource Center.** See their website regarding information for students with disabilities - [http://www.mcburney.wisc.edu/](http://www.mcburney.wisc.edu/)
- **Multicultural Student Center.** The MSC exists to make sure students of all backgrounds are successful at UW. [https://msc.wisc.edu](https://msc.wisc.edu)
- **GUTS (Greater University Tutoring Service) tutoring.** See their homepage to inquire about individual tutors/general tutoring sessions - [http://guts.studentorg.wisc.edu/](http://guts.studentorg.wisc.edu/)
- **UW Writing Center.** See their website for information about drop-in or scheduled appointments with expert writers. They will help with just about any type of writing assignments/needs - [http://www.writing.wisc.edu/](http://www.writing.wisc.edu/)
- **L&S Student and Academic Affairs.** See their website for issues regarding medical absences and other emergencies that may impact your ability to attend courses and complete coursework - [http://saa.ls.wisc.edu](http://saa.ls.wisc.edu)

Please let me know if you need any additional accommodations, I am happy to work with you.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date (Lecture)</th>
<th>Topic</th>
<th>Reading list (see details in footnotes)</th>
<th>Term Paper</th>
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<tbody>
<tr>
<td>1</td>
<td>Mon 3-Sep</td>
<td>No class - Labor Day</td>
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<td></td>
<td>Wed 5-Sep</td>
<td>Welcome and introduction to biogeography</td>
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<td>2</td>
<td>Mon 10-Sep</td>
<td>Requirements for life: Biological context</td>
<td>Ch. 6 Terrestrial Processes (1); Ehleringer 2002 (2)</td>
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<td></td>
<td>Wed 12-Sep</td>
<td>Requirements for life: Biological context</td>
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<td>3</td>
<td>Mon 17-Sep</td>
<td>Requirements for life: Physical environments</td>
<td>Higgins et al. 2011 (3); The Global Climate System (4)</td>
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<td></td>
<td>Wed 19-Sep</td>
<td>Requirements for life: Physical environments</td>
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<td>4</td>
<td>Mon 24-Sep</td>
<td>Geographic distributions: Biomes</td>
<td>Ch. 6 Biomes MacDonald 2003 (5)</td>
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<td></td>
<td>Wed 26-Sep</td>
<td>Biological interactions &amp; Trophic dynamics</td>
<td>Predator-mediated coexist (6); Why is the world green? (7); Topic due</td>
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<td>5</td>
<td>Mon 1-Oct</td>
<td>Biological interactions &amp; Disturbance</td>
<td>Group presentation readings (8)</td>
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<td></td>
<td>Wed 3-Oct</td>
<td>Species ranges</td>
<td>Pearson 2003 (10)</td>
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<td>6</td>
<td>Mon 8-Oct</td>
<td>EXAM 1</td>
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<td>Wed 10-Oct</td>
<td>Dispersal</td>
<td>So Huge a Bignes-Dispersal (9)</td>
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<td>7</td>
<td>Mon 15-Oct</td>
<td>Evolution and speciation</td>
<td>So Huge a Bignes-Evolution (11) &amp; Radiation (12);</td>
<td>Outline Due</td>
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<td>Wed 17-Oct</td>
<td>Speciation and extinction</td>
<td>The Man Who Knew Islands (13)</td>
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<td>8</td>
<td>Mon 22-Oct</td>
<td>Changing earth geography</td>
<td>Bartlein &amp; Prentice 1989 (14); Jackson 2000 (15)</td>
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<td>Wed 24-Oct</td>
<td>Quaternary climate change</td>
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<td>9</td>
<td>Mon 29-Oct</td>
<td>Biogeographic realms</td>
<td>Mercer 2003 (16)</td>
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<td>Wed 31-Oct</td>
<td>Phylogeography &amp; biodiversity</td>
<td>Group presentation readings (17)</td>
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<td>10</td>
<td>Mon 5-Nov</td>
<td>Phylogeography &amp; biodiversity</td>
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<td>Wed 7-Nov</td>
<td>Island biogeography</td>
<td>Island Theory (18); Walter 2004 (19)</td>
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<td>11</td>
<td>Mon 12-Nov</td>
<td>EXAM 2</td>
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<td>Wed 14-Nov</td>
<td>Conservation biogeography</td>
<td>Prugh et al. 2008 (20); Mendenhall et al. 2014 (21); Draft to Peer Due</td>
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<td>12</td>
<td>Mon 19-Nov</td>
<td>Humans as biogeographic force: Domestication</td>
<td>Larson et al. 2014 (22)</td>
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<td>Wed 21-Nov</td>
<td>No class - Happy Thanksgiving</td>
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<tr>
<td>13</td>
<td>Mon 26-Nov</td>
<td>Humans as biogeographic force: Agriculture</td>
<td>Smith 2007 (23)</td>
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Wed 28-Nov 22 Climate change & disease biogeography Smith 2010 (24)  Peer Review Due

14 Mon 3-Dec 23 Biogeography in a changing world Davis 2011 (25); Response to Davis (26)
Wed 5-Dec 24 New topics in biogeography

15 Mon 10-Dec 25

Wed 12-Dec Exam 3 Final Paper Due

Reading details:

7. The World is Green (Hairston, Smith and Slobodkin 1960). ECOmotion Studios - [https://uwmad.courses.wisconsin.edu/d2l/le/content/3356237/viewContent/20654781/View](https://uwmad.courses.wisconsin.edu/d2l/le/content/3356237/viewContent/20654781/View)
8. Group presentation readings:
   A. Trophic downgrading

B. Nutrient subsidies

C. Trophic cascades

D. Disturbance tradeoffs

E. Density dependence hypothesis
9. The Song of the Dodo, pages 141-149
11. The Song of the Dodo, So Huge a Bignes, pages 128-137
12. The Song of the Dodo, So Huge a Bignes, pages 217-234
17. Group presentation readings:
   A. Madagascar
   B. Glacial refugia
   C. Beringia


D. Biotic ferries and dispersal


E. Mountains as barriers


18. The Song of the Dodo, Island theory, pages 409-415


26. Correspondence (2011; responses to Davis et al.). Nature 475:37