

ESPM c125/GEOG c148/IB C166 – Biogeography - Fall 2019

Course: Biogeography

Brief Description: 4 units. Three hours of lecture and one hour of discussion or lab per week. The goals of the course are to (a) examine how geographically-linked characteristics of populations and species influence their potential for evolution and extinction; and (b) provide an overview of the approaches for studying the interplay between geographic ranges, environment, evolution, and extinction. In general, lectures will focus on teaching key biogeographic principles and the relevance of biogeography in forecasting global change. Discussion / lab sections will focus on (1) hands-on exercises and experiences; and/or (2) discussion of papers and controversies .

Instructors: Rosemary Gillespie, Jeff Chambers; GSI Natalie Graham

Time and Place:

Lecture – M,W,F 9-10 a.m in 103 Moffitt Library

Discussion/ lab - W 3pm – 4pm, 2038 VLSB and W 4-5pm, 2070 VLSB

Prerequisites: Bio 1B or similar

GRADING:

Midterm: 20%

Final: 30%. Will include short answer questions plus questions covering material from throughout the semester

Lab/ discussion: 50%. Each lab or discussion will culminate in a report in which students are to answer specific questions.

Instructors: Rosemary Gillespie gillespie@berkeley.edu Office hours: Tu, Thu 11-12 am in Wellman 221
 Jeff Chambers jqchambers@berkeley.edu Office hours: Th 1:30-2:30 pm, McCone 519
 Natalie Graham n.graham@berkeley.edu GSI. Office hours by appointment in Hilgard 221.

Textbook: *Preferred: Biogeography, Fifth Edition, Mark V. Lomolino, Brett R. Riddle, and Robert J. Whittaker, Sinauer Associates. Low cost option: Biogeography, Fourth Edition, Mark V.Lomolino, , Brett R. Riddle, Robert J. Whittaker, James H. Brown, Sinauer Associates*

Week/ dates	Monday/ Wednesday/ Friday (lectures, discussions)	
1: Aug 26	Aug 26: NO CLASS Aug 28: Chapter 1. The Science of Biogeography Aug 30: Chapter 1. The Science of Biogeography Aug 28: Discussion - NO MEETING	JC
2:Sept 2-6	Sept 2: LABOUR DAY Sept 4: Chapter 2. The History and Reticulating Phylogeny of Biogeography Sept 6: Chapter 2. The History and Reticulating Phylogeny of Biogeography Sept 4: LAB: Data collecting, sampling protocols, iNaturalist. Students will go into the field locally and collect and database the organisms they find and see where they are distributed in the context of a bigger database. Outside	RG
3:Sep9-13	Sep 9: Chapter 3. The Geographic Template 2: Visualization and Analysis of Biogeographic Patterns Sep 11: Chapter 3. The Geographic Template 2: Visualization and Analysis of Biogeographic Patterns Sep 13: Chapter 3. The Geographic Template 2: Visualization and Analysis of Biogeographic Patterns Sep 11: Discussion of The Geographic Template - VLSB discussion room 1. Amundson, R. and Jenny, H., 1997. On a state factor model of ecosystems. <i>BioScience</i> , 47(8), pp.536-543. 2. http://www.ucanr.org/sites/Jackson_Lab/files/113436.pdf read introduction	JC

	and through section Grassland Soils in California	
4:Sep16-20	Sep 16: Chapter 4. Distributions of Species: Ecological Foundations Sep 18: Chapter 4. Distributions of Species: Ecological Foundations Sep 20: Chapter 4. Distributions of Species: Ecological Foundations Sep 18: LAB: Databasing, digitization, mapping. Using Jupyter Notebooks (Parts 1 and 2; GBIF, Python) - VLSB discussion room	RG
5:Sep23-27	Sep 23: Chapter 5. The Distribution and Dynamics of Communities, Biomes, and Ecosystems Sep 25: Chapter 5. The Distribution and Dynamics of Communities, Biomes, and Ecosystems Sep 27: Chapter 5. The Distribution and Dynamics of Communities, Biomes, and Ecosystems Sep 25: LAB Remote sensing. Geography Computer lab	JC
6:Sep30- Oct 4	Sep 30: Chapter 6. Dispersal and Immigration Oct 2: Chapter 6. Dispersal and Immigration Oct 4: Chapter 6. Dispersal and Immigration Oct 2: LAB Analysis of data sets on immigration and extinction. (Sticky traps) - VLSB discussion room	RG
7:Oct 7-11	Oct 7: Chapter 8. The Changing Earth Oct 9: Chapter 8. The Changing Earth Oct 11: Midterm on material to date. Oct 9: LAB GIS. Using Jupyter Notebooks (Parts 3 and 4; CalAdapt)- VLSB discussion room	JC
8:Oct14-18	Oct 14: Chapter 7. Speciation and Extinction Oct 16: Chapter 7. Speciation and Extinction Oct 18: Chapter 7. Speciation and Extinction Oct 16: LAB Computer exercise - VLSB discussion room	RG
9:Oct21-25	Oct 21: Chapter 9. Glaciation and Biogeographic Dynamics of the Pleistocene Oct 23: Chapter 9. Glaciation and Biogeographic Dynamics of the Pleistocene Oct 25: Chapter 9. Glaciation and Biogeographic Dynamics of the Pleistocene Oct 23: Discussion of Biogeographic Dynamics - Climate Change - VLSB discussion room 1. Moritz & Agudo. 2. Ashcroft	JC
10: Oct 28- Nov 1	Oct 28: Chapter 10. The Geography of Diversification and Regionalization Oct 30: Chapter 10. The Geography of Diversification and Regionalization Nov 1: Chapter 10. The Geography of Diversification and Regionalization Oct 30: LAB: The plant adaptations lab involves a trip to the Botanical Garden to observe traits of plant species from different parts of the world. Students will develop hypotheses regarding the adaptive role of differences in related tree species. Outside	RG
11:Nov 4-8	Nov 4: Chapter 11. Reconstructing the Evolutionary History of Lineages Nov 6: Chapter 11. Reconstructing the Evolutionary History of Lineages Nov 8: Chapter 11. Reconstructing the Evolutionary History of Lineages Nov 6: LAB: Geographic Range Evolution. BiogeoBears. VLSB discussion room	RG
12:Nov11- 15	Nov 11: Chapter 12. Reconstructing the Geographic History of Lineages & Biotas Nov 13: Chapter 12. Reconstructing the Geographic History of Lineages & Biotas Nov 15: Chapter 12. Reconstructing the Geographic History of Lineages & Biotas Nov 13: LAB: Palynology - fossil pollen - Geography (lab)	RG
13:Nov18- 22	Nov 18: Chapter 13. Island Biogeography Nov 20: Chapter 13. Island Biogeography Nov 22: Chapter 13. Island Biogeography	RG

	Nov 20: Island biogeography. VLSB discussion room	
14:Nov25-29	Nov 25: Chapter 14. Areography, Ecogeography, and Macroecology of Continental and Oceanic Biotas Nov 27: Chapter 14. Areography, Ecogeography, and Macroecology of Continental and Oceanic Biotas Nov 29: THANKSGIVING Nov 27: NO LAB	JC
15:Dec 2-6	Dec 2: Chapter 15. Biogeography of Humanity, Biological Diversity, and Conservation Biogeography Dec 4: Chapter 15. Biogeography of Humanity, Biological Diversity, and Conservation Biogeography Dec 6: Chapter 16. From the Foundations to the Frontiers of Biogeography Dec 4: Discussion: Human biogeography - VLSB discussion room 1. Nielsen, R., Akey, J.M., Jakobsson, M., Pritchard, J.K., Tishkoff, S. and Willerslev, E., 2017. Tracing the peopling of the world through genomics. Nature, 541(7637), p.302. 2. Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D. and Cook, W.M., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science Advances, 1(2), p.e1500052	JC
16:Dec9-13	RRR week	
17:Dec 19	Final	