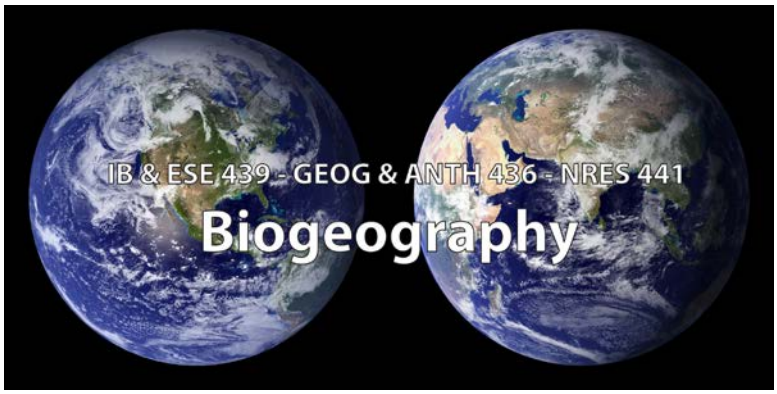

Course Syllabus • Spring 2019
9.30 – 10.50 T/Th • NHB 2083

Course Description

Biogeography deals with spatial and temporal patterns of biological diversity and the factors that govern the distribution and abundance of taxa. This course will address two of its subfields: historical biogeography – the origin, dispersal, and extinction of taxa and biotas; and ecological biogeography – the role physical and biotic environments play in determining taxonomic distributions. We will explore the ecological, evolutionary, climatological, and paleontological foundations for the distribution of species and biological communities. The course will review many of the field's classic papers, the current synthesis of biogeographic theory, and the application of biogeography to conservation.

Course Goals

By the end of the semester, you will be able to:

- Describe the historical and ecological factors which influence the pattern of life on earth
- Explain how advances in paleontology, climatology, evolution, plate tectonics, molecular systematics, and ecology have shaped the modern synthesis of biogeography
- Apply the scientific method and philosophy of hypothesis testing to biogeographic problems
- Evaluate modern conservation and mitigation strategies using biogeographic theory

A second set of goals relate to your development as a successful life-long learner; these include developing the abilities to:

- Evaluate your own knowledge and skills
- Analyze and interpret the primary scientific literature
- Communicate scientific arguments through written and oral work
- Work collaboratively

Prerequisites

This course is intended for juniors, seniors, and graduate students with prior coursework in biology. Enrollment is restricted to students who have taken IB 150 (Organismal & Evolutionary Biology) or have completed equivalent coursework. Additional coursework in Ecology (IB 203), Evolution (IB 302), and Genetics (IB 204) or their equivalents is strongly recommended. Students without this preparation should anticipate devoting additional time each week to independently reviewing fundamental concepts from these courses to keep up with the reading and assignments.

Instructor

Dr. Surangi W. Punyasena
Assistant Professor, Plant Biology; Affiliate: Geology; Geography; Illinois Informatics Institute
Email: punyasena@life.illinois.edu
Office and hours: 139B Morrill Hall; Tuesdays 3.00 – 5.00 pm

Course Website and Communication

Course assignments, readings, and the current syllabus are posted on the Learn@Illinois site:

https://learn.illinois.edu/course/view.php?id=33924

You will need your NetID and password to gain access. Updates to the course will be announced in lecture and as announcements on Learn@Illinois. Please contact me if you have any problems accessing the website.

Official University e-mail addresses are used for course communications. Please note that you are expected to check your University issued e-mail account regularly and act on any communications received. Please use your official University email account at all times. Due to privacy restrictions, I may not be able to respond to e-mail messages sent from non-University e-mail accounts.

Course Structure

We meet twice a week for 80 minutes. Tuesdays are structured as a lecture and class discussion of the week's topic. The anticipated lecture schedule is listed at the end of this document. PDFs of lecture slides will be available on the Learn@Illinois website the morning before class. You are expected to attend lecture; there are weekly in-class assignments that count toward your final grade. Thursdays are structured around paper discussions. Attendance and participation in the Thursday discussion is graded. The final week of class will entail group presentations based on a paper chosen from our *Foundations* text.

Assigned Reading

Reading assignments serve two purposes. They provide context and background to the material covered in Tuesday lectures and they are the source of content for Thursday discussions. They will be listed on the Learn@Illinois course website.

Readings will be taken from peer-reviewed literature and our texts:

Biogeography, Fifth Edition (2016) [Required]
Mark V. Lomolino, Brett R. Riddle, and Robert J. Whittaker
Sinauer Associates
IISBN-13: 978-1605354729
ISBN-10: 1605354724

Foundations of Biogeography: Classic Papers with Commentaries (2004) [Recommended]
MV Lomolino, DF Sax, and JH Brown (editors)
University Of Chicago Press
ISBN-13: 978-0226492377
ISBN-10: 0226492370

These books are available for purchase at the university bookstore and will be on reserve at the Grainger Engineering Library. We use the Lomolino et al. textbook extensively in this class. The *Foundations* text is used for a limited number of assigned papers and in the group presentation assignment. A portion of the book is also available online through Google Books.

The Learning Environment

Our classroom is an inclusive, collaborative environment for focused learning. A fundamental expectation is that you treat your classmates with respect. Disruptive behavior, including unauthorized use of phones and computers is prohibited. You are welcome to use your laptop or a tablet for note taking, but all non-lecture-related use (social media, texting, web surfing, completing homework, etc.) is prohibited.

Anyone violating this policy will first be given a warning, and then asked to leave class, forfeiting any credit for in-class assignments due that day.

Online Pre-Lecture Assignments

These twelve weekly assignments are intended to ensure that you have completed the textbook readings and are prepared for the week's lecture and discussion. They will include 5-10 short answer questions. These must be completed by *Tuesday 9 am* to receive credit.

Lecture Activities

We will have a "5-minute paper" at the end of every lecture, where you have the opportunity to reflect on what you learned and ask questions. We may also occasionally have lecture activities designed to reinforce learning of a specific concept. These must be turned in for credit, 5 points per lecture, for maximum of 60 points, or 6% of your final grade. You may miss one lecture without penalty.

Thursday Discussion

Our Thursday classes focus on the reading of the primary scientific literature. Each week, you are responsible for an in-depth reading of 1 or 2 classic and/or contemporary journal articles. By *9 am each Thursday*, you will need to submit two discussion questions based on the reading to the week's online forum. Please submit each question as a separate post. During class, you will randomly be assigned to a discussion group. You will have 45 minutes to discuss the posted questions as a group, and to post your responses to 5 or more of these questions (not your own!) Questions and responses will be graded for thoughtfulness and the degree to which they demonstrate close reading of the material. We will then discuss these responses as a class. Questions that stimulate the most thought-provoking discussion, based on the class responses and my evaluation, will receive extra credit (~2 points). You will need to bring a laptop or an alternative device capable of connecting to the Learn@Illinois website. You may miss one discussion without penalty.

Final Project

The ultimate goal of the class is for you to demonstrate your literacy and depth of knowledge of biogeography. The group presentations are designed to evaluate the degree to which you have achieved this goal. If you have trouble getting started, please arrange to speak with me well in advance of the due dates!

Prospectus – Due February 21

The presentation prospectus will get you thinking about the final project early in the semester. It will also allow me to assign you to a group with common interests. The prospectus should be 3-5 pages double-spaced. In it you should:

- Choose a paper from *Foundations of Biogeography: Classic Papers with Commentaries* not covered in class
- Identify the major biogeographic themes identified by that paper
- List the complete citation for 5 or more recent peer-reviewed journal articles that help define where this biogeographic subfield is today
- Include context and explanation for these five papers

Groups will be assigned in class on February 28. The size of the groups will depend on the final size of the class.

Presentation outline (group assignment) – Due March 14

The presentation outline is intended to demonstrate the progress your group has made in developing a unified presentation of your ideas. It should be 3-5 pages double-spaced. In it you should:

- Identify the *Foundations* paper that your group will present
- List the biogeographic themes from the paper you will explore further
- Provide a bibliography of at least 5 recent peer-reviewed journal articles that you are reviewing for the presentation
- Outline the major arguments you will make in your presentation

Your group will receive feedback following spring break.

Group presentation (group assignment) – Due April 23-25

I have reserved the penultimate week of classes for group presentations. Presentations should be 8 minutes in length with 2 minutes for questions. A hard copy of your bibliography should also be turned in at this time. Presentations will be evaluated based on the following criteria:

- Thoroughness of the bibliographic research presented
- Originality of ideas
- Quality of the presentation and degree of preparation (slides and speech)
- Ability to answer questions from your peers

Your final grade for the presentation will be determined in part by the evaluations of the members of your group. Members of the class will be asked to submit questions for each presentation.

Grading

Grading is on a 1000-point scale, with points distributed as follows:

Midterm	150
Final	150
Pre-lecture assignments (13, @15 points each)	195
Lecture activities (12, @ 5 points each, lowest dropped)	60
Discussion questions (11, @10 points each)	110
Discussion responses (10, @10 points each, lowest dropped)	100
Presentation prospectus	50
Presentation outline	50
Presentation	90
Presentation peer-evaluations	15
Presentation feedback (10 @ 3 points each)	30
Extra Credit (discussion)	22

Letter grades will be assigned according to an absolute scale.

A+	>970 points	C+	770-799 points	F	0-599 points
A	930-969 points	C	730-769 points		
A-	900-929 points	C-	700-729 points		
B+	870-899 points	D+	670-699 points		
B	830-869 points	D	630-669 points		
B-	800-829 points	D-	600-629 points		

Grade Disputes

Questions regarding grading should be raised within one week of the grades being uploaded to the Learn@Illinois gradebook. It is your responsibility to review your gradebook on a regular basis.

Late Assignments and Absences

Assignments deadlines are coordinated with in-class activities. Therefore, exceptions for late assignments are only provided for documented absences. Pre-lecture activities may be turned in late with instructor permission. Paper summaries will be requested in lieu of missed pre-discussion forum questions.

Request for Special Accommodations

Students requesting accommodations due to documented disabilities or religious observances should contact me within the first two weeks of class. Exams at alternate facilities should be arranged at a time within 24 hours of the regularly scheduled exam.

Academic Integrity

All students are assumed to have read and understood the University of Illinois Student Code, (https://studentcode.illinois.edu/) and will be expected to act accordingly. Please review the code carefully as it outlines your rights and responsibilities as a student at this university.

Course Copyright

Tentative Lecture and Discussion Schedule

Updates to the lecture, discussion, and exam schedules will be announced in lecture and as messages on Learn@Illinois.

Week 1: What is Biogeography?		
Tu 15-Jan	Lecture 1	Species in space and time *Pre-lecture assignment due 9 am*
Th 17-Jan	Paper Discussion	Fundamental patterns in biogeography: the latitudinal gradient • Foundations, Paper 3 – Forster (1778) • Stevens (1989). The American Naturalist, 133(2): 240–256 *Pre-discussion assignment due Wed 11:59 pm*
Week 2: The Geographic Range		
Tu 22-Jan	Lecture 2	Physical and biotic controls of the species range *Pre-lecture assignment due 9 am*
Th 24-Jan	Paper Discussion	Conceptualizing the range • Brown, Stevens, and Kaufman (1996). Annual Review of Ecology and Systematics, 27: 597–623 *Pre-discussion assignment due Wed 11:59 pm*
Week 3: The Niche		
Tu 29-Jan	Lecture 3	Defining the niche *Pre-lecture assignment due 9 am*
Th 31-Jan	Paper Discussion	The niche in space and time • Jackson and Overpeck (2000). Paleobiology, 26(4): 194–220 *Pre-discussion assignment due Wed 11:59 pm*
Week 4: Migration and the Geographic Range		
Tu 5-Feb	Lecture 4	Dispersal and migration *Pre-lecture assignment due 9 am*
Th 7-Feb	Paper Discussion	Species "invasions" • Foundations, Paper 27 – Grinnell (1922) • Sax and Brown (2000). Global Ecology and Biogeography, 9: 363–371 *Pre-discussion assignment due Wed 11:59 pm*
Week 5: Vicariance versus Dispersal		
Tu 12-Feb	Lecture 5	The fundamental debate of historical biogeography *Pre-lecture assignment due 9 am*
Th 14-Feb	Paper Discussion	Darwin's rafts and duck feet • Foundations, Paper 11 – Darwin (1859) • Hazzi et al (2018). PNAS, 115(31): 7985-7990 *Pre-discussion assignment due Wed 11:59 pm*

Week 6: Evolution, Niche, and the Geographic Range		
Tu 19-Feb	Lecture 6	The geographic context of evolution *Pre-lecture assignment due 9 am*
Th 21-Feb	Paper Discussion	Evolution, climate change, and species range • Davis and Shaw (2001). Science, 292(5517): 673-679 • de Lafontaine et al (2018). Ecology, 99(7): 1530-1546 *Pre-discussion assignment due Wed 11:59 pm* ***PRESENTATION PROSPECTUS DUE***
Week 7: Midterm Exam		
Tu 26-Feb	Midterm Exam: In-Class & Closed Book	
Th 28-Feb	Final Project: Organization and Review	
Week 8: The Evolutionary Signature of Biogeographic History		
Tu 5-Mar	Lecture 7	Genetic reconstructions of migration and isolation (phylogeography) *Pre-lecture assignment due 9 am*
Th 7-Mar	Paper Discussion	Refugia past and present • Weir et al (2016), PNAS 113 (38) E5580-E5587 • Morelli et al (2016), PLoS ONE 11(8): e0159909 *Pre-discussion assignment due Wed 11:59 pm*
Week 9: Extinction and the Geographic Range		
Tu 12-Mar	Lecture 8	Extinction shapes geographic range – geographic range shapes extinction *Pre-lecture assignment due 9 am*
Th 14-Mar	Paper Discussion	Extinctions shape diversity • Noygeus-Bravo et al (2018). Trends in Ecology and Evolution, 33(10): 765-776 • Barnosky et al. (2004) Science, 306(5693): 70-75 *Pre-discussion assignment due Wed 11:59 pm* ***PRESENTATION OUTLINE DUE***
Week 10: Spring Break		
Tu 19-Mar	No Classes	
Th 21-Mar		
Week 11: The Biogeography of Islands		
Tu 26-Mar	Lecture 9	Islands and the balance of diversity *Pre-lecture assignment due 9 am*
Th 28-Mar	Paper Discussion	Conservation and species-area • Foundations, Paper 54 – MacArthur and Wilson (1963) • Jackson and Sax (2010) Trends in Ecology and Evolution, 25(3)153-160 *Pre-discussion assignment due Wed 11:59 pm*
Week 12: Biomes and Communities		
Tu 2-Apr	Lecture 10	Community assembly (Clements, Gleason, and modern syntheses) *Pre-lecture assignment due Wed 11:59 pm*

Th 4-Apr	Paper Discussion	The shifting community • Gleason (1926). Bulletin of the Torrey Botanical Club, 53(1): 7-26 • Ricklefs (2008). American Naturalist, 172(6): 741-750 *Pre-discussion assignment due Wed 11:59 pm*
Week 13: Conservation Biogeography		
Tu 9-Apr	Lecture 11	Land use and human impacts *Pre-lecture assignment due 9 am*
Th 11-Apr	Paper Discussion	Interpreting environmental impacts • Nolan et al (2018). Science 361(6405): 920 - 923 • Dawson et al (2011). Science 332 (6025): 53-58 *Pre-discussion assignment due Wed 11:59 pm*
Week 14: Applications of Biogeography		
Tu 16-Apr	Lecture 12	TBA
Th 18-Apr	Lecture 13	Guest Lecture: Dr. Mark Lara, Plant Biology
Week 15: Group presentations		
Tu 23-Apr	Groups 1 - 5	
Th 25-Apr	Groups 6 - 10	
Week 16: Final Exam		
Tu 30-Apr	IN-CLASS & CLOSED BOOK	