

Course : **Geog 307 –Biogeography: Theory and Method**

Semester : Spring 2005

Course Format
And Credit hours : 3 hr Lecture and Discussion

Prerequisites : Geog 107 or consent of instructor

Instructor : Dr. Amy E. Hessler, 420 White Hall
293-5603 ext. 4344, Amy.Hessler@mail.wvu.edu

Schedule : Tues/Thurs 4-5:15 p.m.

Location : Room 304 and 312 White Hall

Office Hours: Mon. 9-10:30 am, Tues. 1-2:00pm or by appointment

Course Objectives : The objectives of this course are to present the multiple scales of analysis currently practiced by biogeographers, including analysis focused on individuals, communities, landscapes, biomes, and the entire biosphere. Quantitative methods and models will be applied to current questions regarding environmental problems in the biosphere. Students will be expected to work individually and in small groups.

Expected Learning
Outcomes :

Upon successful completion of this course:

1. Students will understand the importance of space, time, and scale in biogeographical theory and practice.
2. Students will understand the importance of species-level life history patterns for migration.
3. Students will be able to apply different measures of biodiversity to community level data.
4. Students will be able to use tabular databases to generate species-area curves.
5. Students will understand the history of island biogeography theory and its role in conservation biology.
6. Students will be able to use a specialized software package (Fragstats) to calculate measures of biodiversity at landscape scales.
7. Students will understand basic biogeochemical cycling (carbon, nitrogen and water) at the biome scale and will be able to run a biogeochemical model (Biome-BGC) for an evergreen needle leaf forest.

8. Students will improve their analytical and quantitative skills through exercises using MS Excel and PSI-plot's calculation and graphing capabilities.
9. Students will increase their proficiency in oral and written communications through assignments and discussion.
10. Students will gain experience working with a team of their peers.

Required Text:

MacDonald, G. 2001. *Space, Time and Life: The Science of Biogeography*. Wiley. P. 336.
ISBN: 0-471-24193-8.

Related readings for article summaries. These will be placed on electronic reserve (<http://ereserves.lib.wvu.edu/>).

Username: hessl

Password: 738

Franklin, J.F. 1993. Preserving biodiversity: species, ecosystems or landscapes. *Ecological Applications*: 202-205.

Noss, R.F. 1983. A regional landscape approach to maintain diversity. *BioScience* 33:700-706.

MacArthur, R.H. and E.O. Wilson. 1963. An equilibrium theory of insular zoogeography. *Evolution*. 17:373-387.

McLaren, B.E. and R.O. Peterson. 1994. Wolves, moose and tree rings on Isle Royale. *Science* 266:1555-1558.

Pitelka, L.F. and the Plant Migration Workshop Group. 1997. Plant migration and climate change. *American Scientist* 85:464-473.

Sprugel, D.G. 1991. Disturbance, equilibrium, and environmental variability: what is 'natural' vegetation in a changing environment? *Biological Conservation* 58:1-18.

Swanson, F.J., Kratz, T.K., Caine, N., and R.G. Woodmansee. 1988. Landform effects on ecosystem patterns and processes. *BioScience* 38(2):92-98.

Turner, M.G. 1989. Landscape ecology: the effect of pattern on process. *Annual Review of Ecological Systematics* 20:171-197.

Webb, T. 1981. The past 11,000 years of vegetational change in Eastern North America. *BioScience* 31:501-506.

Wiens, J.A. 1989. Spatial scaling in ecology. *Functional Ecology* 3:385-397.

Grading :

	Percent	Points
Assignments (10)	40%	200
Exams (2)	40%	200
Article Summaries (5)	10%	50
Class Participation	10%	50
Total	100%	500

Grade Assignment :

Percent	Points	Grade
90-100	>450	A
80-89	400-449	B
70-79	350-399	C
60-69	300-349	D
0-59	0-299	F

Grading Policy :

No make-up exams except by prior arrangement with instructor. Late assignments (turned in after 5:15pm the day they are due) receive 50% of earned credit but may be turned in up until the last day of classes.

Assignments:

Students must complete 10 of the 12 assignments. I recommend completing them all and dropping your two lowest grades. Time will be available during class to complete these assignments, but students will occasionally need to complete these assignments outside of class. Assignments may be performed by groups of 2 students, but each student must turn in his/her own work. Each assignment will be worth the same credit. **Assignments in total will be worth 50% of the student's grade.**

In addition, students must turn in five article summaries (worth 10 points ea.) based on the recommended article readings. Please see attached example and instructions. These must be turned in the week the reading is assigned, however students may write additional summaries and choose the best five scores.

Attendance Policy:

Consistent with WVU guidelines, students absent from regularly scheduled examinations because of authorized University activities will have the opportunity to take them at an alternate time. Make-up exams for absences due to any other reason will be at the discretion of the instructor. Students may miss one class meeting due to illness (but must make up any missed assignments). Additional absences will result in a drop of one letter grade for each absence.

Social Justice
Statement :

“West Virginia is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class. Please advise me and make appropriate arrangement with Disability Services (293-6700).”

Course Schedule:

Week	Dates	Unit	Topic	Reading	Lab Assignment
1	1/11/05 1/13/05	Introduction	History of Biogeography; Species, communities, landscapes, and biomes	Ch. 1,2 Weins 1989	Excel Tutorial, Climate and NPP exercise
2	1/18/05 1/20/05	Physical controls on Species, Communities, Biomes	Aspect, Elevation, Climate and soils review	Ch. 3 Swanson et al. 1988	Environmental space of WA forest species
3	1/25/05 1/27/05	Energy and nutrient flows in ecosystems	Biogeochemical processes	NTSG website: http://www.ntsg.umt.edu/	Biome-BGC exercise
4	2/01/05 2/03/05		Biological Interactions	Ch. 4 McLaren and Peterson 1994	
5	2/08/05 2/10/05	Geographic Range	Dispersal and migration	Ch. 8 Pitelka et al. 1997	Eastern forest species atlas
6	2/15/05 2/17/05		Evolution, Speciation & Distributions	Ch. 9, 10 pgs 377-393	Hawaii movie, viable population exercise
7	2/22/05 2/24/05	Historical Patterns and Processes	Continental drift and glaciation	Ch. 7 Webb 1981	Paleoecology exercise
8	3/01/05 3/03/05	Biomes	World Biomes	Ch. 6 & Lori Daniels' Biogeography Image Exchange (WWW)	Biome NPP exercise
9	3/08/05 3/10/05	Exam/Review Midterm			
10	3/15/05 3/17/05	Spring Break			
11	3/22/05 3/24/05	Biomes	World Biomes	Pielke and Vidale 1995	
12	3/28/05 3/29/05	Disturbance	Disturbance and succession	Ch. 5 Sprugel 1991	TBA
13 AAG	4/05/05 4/07/05	Diversity	Measuring biodiversity	Ch. 14 Noss 1983	Biodiversity in National Parks

14	4/12/05 4/14/05		Island Biogeography Theory	Ch. 14 MacArthur and Wilson 1963; Wilkinson 1993	Species-area in National Parks
15	4/19/05 4/21/05		Landscape Ecology	Turner 1989	Fragstats and forest fragmentation
16	4/26/05 4/28/05	Biogeography and Conservation	Biodiversity, Exotic Species, and Climate Change	Ch. 15 Franklin 1993	Discussion
17	5/03/05	Final Exam (take home). Due 5pm 5/03/05. No exceptions.			