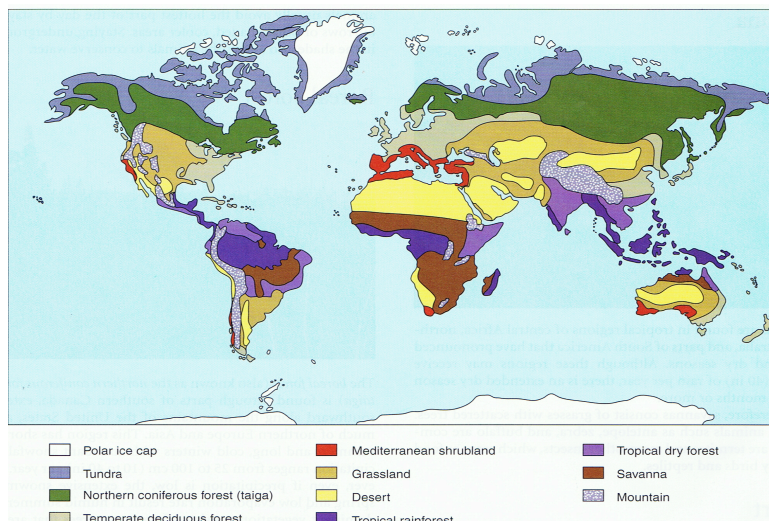
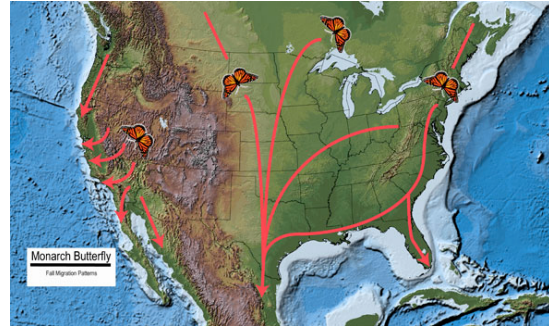


Biogeography: Space, Time, and Life
GGS 321
Biology 374 (001)
Spring 2016

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The science of biogeography is one of the most interdisciplinary endeavors as it links the disciplines of ecology, biology, and geography. The core principles of biogeography are to (i) document the distribution of plants, animals and microbes on the surface of the Earth and (ii) understand the processes that contribute to the variable patterns in distribution of biota. The former principle is a re-visitation of the tools and methodologies employed by naturalists and the subsequent products that they produce. The second principle, the more mechanistic initiative, is the one that is interdisciplinary as the distribution of each biome, community, species and population reflects a unique combinations of factors based on biology (e.g., inherent growth and physiology), geography (e.g., role of disparate landscape types in controlling dispersal and migration), and ecology (e.g., interactions among competing species). An added incentive to understand biogeography is the resurgence in a host of applied issues that require biogeographical skills and knowledge, including climate change, conservation of species, invasive species, evolution, biodiversity, and land use planning.



I. INTRODUCTION, COURSE OBJECTIVES AND EXPECTATIONS

Objective: Provide the student with a broad understanding of how physical geography and the environment influence the spatial and temporal distribution of plants and animals on the surface of the Earth.

This objective is met by a combination of activities designed to provide an understanding of the following:

- first principles underlying the distribution of species, populations, communities and biomes on the surface of the Earth;
- first principles underlying the distribution of species, populations, communities and biomes over geological time; and
- discuss the theory and practice of using biogeographical information/principles to understand current research areas in geography, ecology, and the environmental science (e.g., evolution of humankind, biological diversity, conservation science, climate change, and invasive species).

II. FIRST PRINCIPLES

Objective: Develop a knowledge base in biogeography centered on the following:

Physical geography
Physical environment and the distribution of life
Biological interactions and the distribution of life
Disturbance and landscape ecology
Communities and biomes
Changing continents and climate
Dispersal, colonization and invasion
Evolution, speciation and extinction
Biogeographical regions of the Earth

III. Biogeography: Theory and Practice

Objective: Using timely case studies, develop a framework for understanding how the issues evolved and the consequences for science and policy. For each topic, the initial discussion focuses on general principles followed by an in-depth presentation/discussion of one noteworthy aspect (a case study) of the topic. These are candidates for this discussion:

Evolution and Biogeography of Humankind

Case Study: *Aridipithecus ramidus* to *Homo sapiens*
Biogeographical spread from Africa to the Americas

Climate change and Biogeography

Case Study: Anticipated changes in the distribution of biota, ecosystems and biomes

Island Biogeography

Case Study: Significance to the discipline of biogeography

Biological diversity

Case Study: Latitudinal gradient

Conservation Science and Biogeography

Case Study: Spatial and temporal sanctuaries for rare and endangered species

Invasive species and Biogeography

Case Study: The principles of success and failure of biological invasions

Wetland Biogeography

Case Study: An orphan of biogeographical attention

Class Schedule: Class meets weekly on Tuesday and Thursday at 10:30 - 11:45 AM in Exploratory Hall 2310

Class Format: The first half of the course focuses on the core elements of biogeography, and the second half addresses case studies/applications in biogeography. In both, the class format will be a combination of lecture and discussion.

Weekly Journal Research Reports. Once during the semester, each student reports on a recent research manuscript published in a peer-reviewed journal. The selection of the article will be the student's own choosing from a list of recognized peer-reviewed journal in biogeography. The oral report will be ~ 3 minutes in length. A template for reporting will be offered early in the course. There will be two reports per week.

Written Essay. Once during the semester (immediately after the first test) a list of essay topics (N=3) will be distributed from which you select one topic. You will have ~10 days to develop a short essay/critique (~2 pages). This two essays will account for 8% of your total grade and is designed to be of guidance in writing your research paper.

Tests. Three times during the semester, in-class tests will be given. These tests will be short answer (i.e., multiple choice). Each of these tests will account for 20% of your grade; cumulatively, they will account for 60% of your final grade.

Final Exam. There is no final exam for this course.

Research Manuscript and Presentation. Each student will submit a research manuscript (> 10 pages in length) meant to hone one's skill in independently researching a topic (of her/his choosing) and developing a scientifically sound analysis of the issue. In addition, each student will provide an oral presentation of the research (~ 8 minutes) during the last two weeks of the class. The total contribution of this effort to one's final grade is 30%, with the written presentation being 25% and the oral presentation being 5%.

Course Expectations: Students are expected to (i) read selected background chapters from the text by MacDonald, (ii) participate in classroom discussions, (iii) provide one weekly research report from the peer-reviewed literature, (iv) compose two essays, and (v) provide a critical analysis of a select issue in biogeography (of the student's own choosing) demonstrating his/her ability to evaluate the scientific basis for the issue. The last expectation will be met in the form of a written manuscript (~10 pages) and an oral presentation (~8 minutes).

Course Grading: Grading is based on (i) three in-class tests (combined value of 60%), (ii) research manuscript (30%), (iii) one written essay (7%), and class attendance (3%). For any of the above (i-iii) that are not submitted, a grade of zero will be assigned. For assignments that are submitted late, a single letter grade (i.e., 10 points) will be subtracted for each day of lateness (whole or part).

Course Text: MacDonald, Glen. 2003. *Biogeography: Introduction to Space, Time and Life*. John Wiley and Sons. New York, NY. Required

Reference Text: Lomolina, MV, Riddle, BR, and Brown, JH. 2006. *Biogeography*. Third Edition. Sinauer Associates, Inc. Sunderland, MA. Not required.

Course Instructor. The principal instructor is George Taylor, who is responsible for all class activities. The instructor is available for consultation at any time although it is encouraged that an appointment be arranged.

Honor Code

Students are expected to follow the George Mason University rule of student conduct, as note in the catalog:

“George Mason University shares in the tradition of an honor system that has existed in Virginia since 1842. The Honor Code is an integral part of university life. On the application for admission, students sign a statement agreeing to conform to and uphold the Honor Code. Therefore students are responsible for understanding the provisions of the code. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. Therefore, cheating and attempted cheating, plagiarism, lying, and stealing of academic work and related materials constitute Honor Code violations. To maintain an academic community according to these standards, students and faculty must report all alleged violations of the Honor Code to the Honor Committee. Any student who has knowledge of, but does not report, an Honor Code violation may be accused of lying under the Honor Code”.

In evaluating your performance, Professor Taylor operates under the assumption that the work you submit is solely your own and within the guidelines specified in class.

Academic Integrity

GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor

What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

GMU Email Accounts

Students must activate their GMU email accounts to receive important University information, including messages related to this class.

Office of Disability Services

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS (<http://ods.gmu.edu>).

Other Useful Campus Resources

Writing Center: A114 Robinson Hall; (703) 993-1200; <http://writingcenter.gmu.edu>

University Libraries "Ask a Librarian"; <http://library.gmu.edu/mudge/IM/IMRef.html>

Counseling and Psychological Services; (703) 993-2380; <http://caps.gmu.edu>

University Policies

The University Catalog (<http://catalog.gmu.edu>) is the central resource for university policies affecting student, faculty, and staff conduct in university affairs.

This syllabus may be altered during the semester as circumstances warrant. Any changes will be discussed.