



Department of Geography & Geoinformation Science

Biogeography: Space, Time, and Life

GGs 321-001 | BIO 374-001 Syllabus - Spring 2024

Class Meetings: T- 10:30 am – 1:10 pm | Exploratory Hall 2103

Contact Details for Instructor		Graduate Teaching Assistant
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Office hours	M - 1:00 pm – 2:00 pm (online) & W- 1:30 pm - 2:30 pm (In-person) or by appointment	TBA

Course Description:

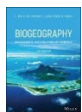
A survey of the relationship between distribution of plants and animals on the earth surface and the physical geography and environmental characteristics.

Recommended Prerequisite: GGS 122 or permission of instructor.

Course overview

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 combination 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.

Required Textbooks:



An Ecological and Evolutionary Approach. 10th Edition
C. Barry Cox; Richard J. Ladle; Peter D. Moore

Recommended Textbook:

David Quammen. The Song of the Dodo: Island Biogeography in an Age of Extinction. Scribner, 1997

Learning Outcomes

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

- Understand the science of Biogeography
- develop a broad understanding of how physical geography and the environment influence distribution of plants and animals on the earth's surface.
- understand the linkages between patterns and processes across a range of spatial and temporal scales.
- provide critical understanding of key concepts related to ecological and historical biogeography.
- identify important events in the earth's geological history and their impact on biodiversity today.
- apply geospatial techniques to investigate spatial patterns of species, biomes, and ecosystems.
- Using the lab assignments, students will demonstrate an understanding of the methods of scientific inquiry

Learning Management Systems

- This Blackboard is our course management system which provides access to course materials, assignments, and class discussions. You will log in to Blackboard using your George Mason username and password through this link: <https://mymasonportal.gmu.edu>.
- If you have computer problems, please contact ITS Support Center: <http://itservices.gmu.edu>;
- Email: support@gmu.edu; | Phone: 703-993-8870.

Course Assignments and Grading Breakdown

Students are expected to submit high quality assignments during this course via the Blackboard. All assignments are to be completed according the dates outlined in the syllabus.

Course Assignment Requirements Description	Percentage (%)
Discussion Forum	5%
Online Quizzes	7%
Class Discussion Leaders	3%
Biogeography/GIS Lab Reports	20%
Exam 1	10%
Exam 2	15%
Research Paper	25%
Scaffolding Assignments	5%
Final Presentation	10%

Grades will be assigned based on the distribution scheme below

Range	Letter Grade	Grade description	Range	Letter Grade	Grade description
93 - 100	A	Excellent	77 - 79	C+	Above satisfactory
90 - 92	A-	Very Good	70 - 76	C	Unsatisfactory
87 - 89	B+	Good with merit	60 - 69	D	Unsatisfactory
83 - 86	B	Good	<60	F	Failure
80 - 82	B-	Above satisfactory			<i>There is No C- grade</i>

Description of Assignments

1. Discussion Forums [5%]

Class discussion is an important part of any college experience. You will have a structured opportunity to interact with each other through guided questions related to class topics. This will consist of your posting followed by comments or response, questions on your classmate's posting. Your contribution will be rated according to the scientific content, critical thinking and concept application based on the rubric posted through the Blackboard. Your initial thought-provoking posting should be submitted before class meeting and your response to at least 2-3 students should be posted by Sunday.

2. Biogeography/GIS Lab Reports [20%]

You will be introduced to a number of concepts aligned to Biogeography. Examples include the Theory of Island Biogeography, spatial scale, size and distance and its impact on biogeographic processes, species distribution etc. Additional activities will include simulation colonization and extinction on Islands, Campus Outdoor Education/Field Trips, other Virtual Field Trips and Google Earth Tours to observe natural world and explore ecological processes and the human impacts on ecosystems transformation, just to mention a few. We will also be introduced to geospatial technologies using ArcGIS Pro.

Through these activities, you will be able to investigate the range and distribution of a species at varying scales to determine why a species is found in location x not y; perform a graphical analysis of species richness; explore endangered species; examine tree distribution for a specific location e.g. North America, etc.

Detailed instructions regarding these Biogeography Labs will be posted through the Blackboard.

In addition to using ArcMap, you will familiarize yourself with an open source Maxent program for maximum entropy modelling of species' geographic distributions.

(https://biodiversityinformatics.amnh.org/open_source/maxent/)

3. Class Discussion Leaders [3%]

Bi-weekly, you'll be chosen to lead a class discussion based on assigned readings. Formulate thought-provoking questions (exploratory, analytical, etc.) to challenge deeper understanding and relate to personal experiences. Submit at least 2 questions by 5 pm before your assigned class. After the discussion, summarize its key points in a 650-700-word report and post your summary through the Blackboard

4. Examination [25%]

There will be 2 Exams [Exam 1 (10%) and Mid-Term Exam (15%)]. The exam will be mostly objective in nature with questions that will allow students to analyze, apply, and synthesize lecture, videos and homework concepts and reading material. Exam may include multiple-choice, true-false, matching, fill-in the blank, and short answer questions.

5. Research Paper (25%) | Scaffolding Assignments (5%)

You will conduct a comprehensive literature review on the biogeography of a chosen species or genus, exploring patterns of distribution, dispersal, and diversification. In this research paper, you will highlight the significance of studying its biogeography. Detailed instructions will be discussed both in class and on Blackboard, guiding you every step of the way. Evaluation for this research paper will be divided into scaffolding assignments such as topic description, annotated bibliography, draft, and peer review [5%].

6. Research Presentations [10%]

As the semester draws to a close, prepare to embark on a final biogeographical presentation. During the final week, you'll stand before your peers and unveil the captivating story of your chosen research topic. Be ready to field insightful questions and ignite a stimulating academic dialogue – this is your chance to demonstrate your understanding on biogeographical issues.

7. Online Quizzes [5%]

All practice quizzes will be completed through the Blackboard. The aim of the assignment is for you to familiarize with the terms used in the course, identify what you know and what you don't know. This learning process will help you feel more confident about the material and be prepared for Exam.

Late Submissions Policy

- Stick to the schedule! Due dates are listed clearly in the syllabus and Blackboard. But **"life happens,"** so you have two **flex days** to submit up to two assignments up to 2 days late (no penalty). After that, late penalties apply - 5 points per day, down to zero (no grade).

Student Responsibilities

- Stay engaged with material, discussions, and deadlines.
- Respect classmates and express opinions courteously.
- Value and learn from diverse perspectives.
- Communicate clearly and professionally in writing.
- Emails: Strictly, use Mason Email Account. If you sent email from non-Mason account that email will not be read.

Academic Integrity

George Mason University operates under an honor system, which is published in the University Catalog and deals specifically with cheating, attempted cheating, plagiarism, lying, and stealing. You are therefore expected to take this course in adherence to GMU and Department standards for Academic Integrity.

Please familiarize yourself with the honor code, especially the statement on plagiarism

(<http://www.gmu.edu/org/honorcouncil/guidelines.htm>). Plagiarism will result in a failing grade of the course.

Disability Accommodations

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit <http://ds.gmu.edu/> for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474.

Diversity and Inclusion

George Mason University is committed to providing equal opportunity and an educational and work environment free from any discrimination on the basis of gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, age and ability, marital status, pregnancy status, or genetic information. George Mason University shall adhere to all applicable state and federal equal opportunity/affirmative action statutes and regulations.

Sexual Harassment, Sexual Misconduct, and Interpersonal Violence

As a faculty member, I am designated as a “Responsible Employee,” and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per University Policy 1412. If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as Student Support and Advocacy Center (703-380-1434) or Counseling and Psychological Services (CAPS) (703-993-2380). You may also seek assistance from Mason’s Title IX Coordinator by calling 703-993-8730 or emailing cde@gmu.edu.

Student Privacy

George Mason University strives to fully comply with FERPA by protecting the privacy of student records and judiciously evaluating requests for release of information from those records. Please see George Mason University’s student privacy policy <https://registrar.gmu.edu/students/privacy>.

Student Support Services

George Mason University has several academic support and other resources to facilitate your success. Some of these resources are presented below:

- i. Counseling and Psychological Services: (See <http://caps.gmu.edu/>)
- ii. Learning Services, University Career Services: <http://careers.gmu.edu/>)
- iii. The Writing Center (See <http://writingcenter.gmu.edu/>)
- iv. University Policies: (See <http://universitypolicy.gmu.edu>)
- v. Student Support and Advocacy Center: See <http://ssac.gmu.edu>)
- vi. The Stearns Center for Teaching and Learning Website below:
<https://stearnscenter.gmu.edu/knowledge-center/knowing-mason-students/student-support-resources-on-campus/>

Absences & Accommodations

- **Religious Holidays:** Please refer to George Mason University’s calendar of religious holidays and observations (<http://ulife.gmu.edu/calendar/religious-holiday-calendar/>). It is the student's responsibility to speak to the instructor in advance should their religious observances impact their participation in class activities and assignments.
- **Absence for documented illness:** Students who miss multiple virtual classes due to prolonged illness should seek medical care and provide documentation of such to the Dean’s Office, which will communicate with the student's professor(s). A prolonged absence may necessitate the student’s withdrawal from the course or from the University for the semester.
- **At the discretion of the professor:** There may be cases where an absence is undocumented but is, nevertheless, excused by the professor (e.g., absence due to a death in the family). Students should initiate a conversation with their professors about the nature and duration of the absence, in advance of the absence whenever possible.

When absences are excused, students remain responsible for all assigned work, and shall be provided with the opportunity to make up, without penalty, any work that they have missed.

Course Calendar: *Faculty reserves the right to alter the schedule as necessary, with notification to students.*

Week	Date	Topic Description	Textbook Chapters	Assignment Activity Due date (Time is consistent - 11:59 pm)
1	1/16	Course Overview	NA	Self-Introduction by end of Week 1
2	1/23	Introduction and History of Biogeography -- GIS hands-on Activity	Ch. 1	Intro to GIS - Installation
3	1/30	Patterns of Distribution [Species & Communities]	Ch. 2 & 3	Online Discussion 1: [Check Bb] <ul style="list-style-type: none"> ○ Initial Post due Tuesday ○ Comments due Sunday
4	2/6	Patterns of Distribution [Species & Communities] – GIS hands-on Activity	Ch. 2 & 3	<i>GIS Lab 1: Introduction to GIS – 2/11</i>
5	2/13	Patterns of Biodiversity	Ch. 4	Online Discussion 1: [Check Bb] Quiz #1 – 2/18 Tentative Topic Description 2/18
6	2/20	Start Historical Processes Test 1	Ch. 5-7, 10-12	Test 1 – 2/20
7	2/27	Historical Biogeography 1	Ch. 5-7, 10-12	<i>GIS Lab or Biogeography Lab Report 2 – 2/25</i> Online Discussion 1: [Check Bb]
8	3/5	Spring Recess [No Classes]		
9	3/12	Historical Biogeography 1	Ch. 5-7, 10-12	Online Discussion 1: [Check Bb] Annotated bibliography- 3/17
10	3/19	Island Biogeography - GIS Hands-on Activity	Ch. 7	Quiz #2 – 3/24
11	3/26	Island Biogeography	Ch. 7	Online Discussion 1: [Check Bb] <i>GIS Lab or Biogeography Lab Report – 3/31</i>
12	4/2	Conservation Biogeography	Ch. 14	Quiz #3 – 4/7 Draft – 4/8
13	4/9	Test 2	Test 2	Online Discussion 1: [Check Bb]
14	4/16	Human Biogeography - GIS Hands-on Activity	Ch. 13	Quiz #4 – 2/21 Peer Review - 4/21
15	4/23	Future of Biogeography	Ch. 14	<i>GIS Lab or Biogeography Lab Report 4 – 4/28</i>
16	4/30	Final Presentation		
	5/5	Final Research Paper due [5/5]		