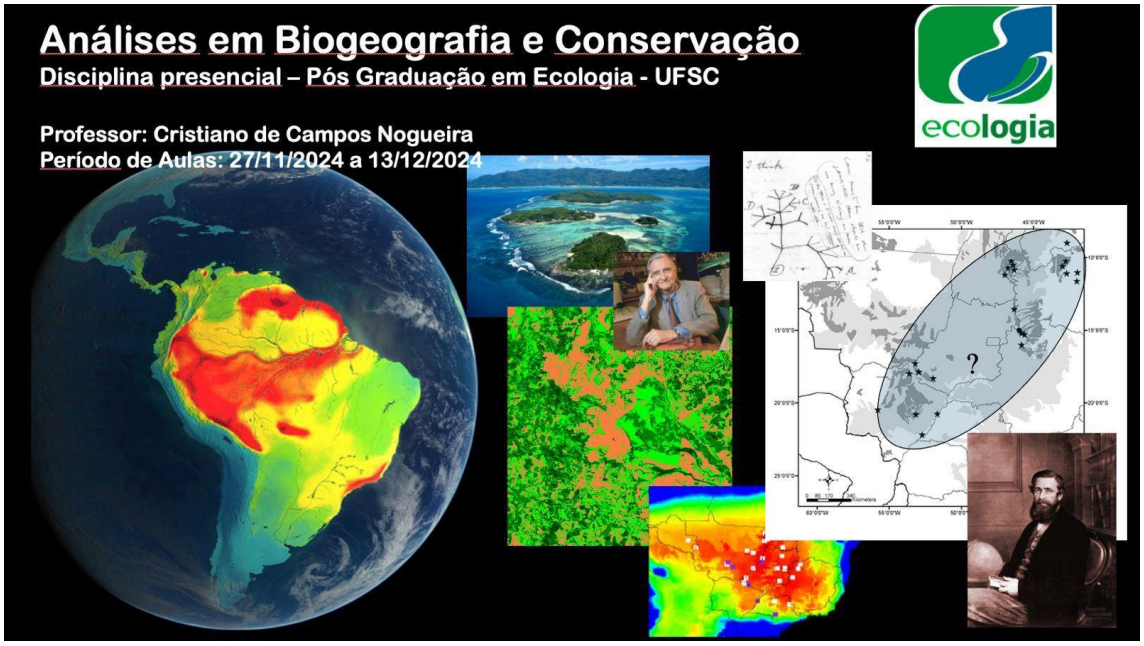

Code: ECO410057
Subject name: Analysis in Biogeography and Conservation
Number of Credits: 4
Total Class Hours: 60 class hours
Teacher: Cristiano de Campos Nogueira, Ph.D.
(cristiano.nogueira@ufsc.br or cnbiogeo@gmail.com)

Preferred semester:
[ ] first
[x] second
Duration:
[ ] semester (one day or shift per week)
[x] semi-condensed (2-3 days per week, ends in a few weeks)
[ ] condensed (several days per week, ends in up to two weeks)
Format:

[x] 100% in-person
[ ] hybrid, with XX% in-person and XX% remote
[ ] 100% remote
Probable days and shifts: Variable, 2:00 p.m. to 6:00 p.m. (see timetable, below)
Number of vacancies: 15
Prerequisites:

Syllabus

To provide students with a general and integrated view of current scientific issues in the field of biodiversity mapping and conservation. The course topics will mainly deal with studies of continental vertebrate diversity, emphasizing the importance of basic knowledge in taxonomy and distribution as starting points for syntheses in geographic distribution and conservation biogeography. However, the central concepts discussed and the methods are applicable to different groups of organisms (e.g. flora, marine fauna or invertebrates), at different scales, domains and biogeographic regions. Whenever possible, emphasis will be given to studies developed with Brazilian and Neotropical biotas, based on recent examples in the scientific literature. Through the combination of theoretical classes, practical exercises and critical readings, students will be encouraged to formulate questions and have a first contact with central aspects of biological diversity mapping and analysis. The course aims to provide the foundations and a first contact with analyses and theory of biodiversity science and conservation biogeography, lines of research that are rapidly developing and crucial for the integration of basic research and applied ecology in conservation, with an emphasis on megadiverse Neotropical biotas (and its complex challenges). The course will contribute to the consolidation of two new lines of research in the Postgraduate Program in Ecology: Evolutionary Ecology, Macroecology and Biogeography, and Human Ecology. Biodiversity Management and Conservation.

Teaching Methodology

• Lectures with audiovisual material.
• Discussion and presentation of articles.
• Practical exercises on biodiversity mapping methods and geographic distributions.

Evaluation

- Participation during discussions and lectures
- Practical activities

- Attendance will be recorded for each class.

Approval in the course will be based on obtaining a final grade equal to or higher than seven point zero (7.0), according to the calculation above, and attendance of at least 75% of the discipline's activities (Art. 50 of Resolution No. 95/CUn/2017).

Legislation

Recording, photographing or copying of classes made available on Moodle is not permitted. Unauthorized use of original material taken from classes constitutes

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counterfeiting – copyright infringement – according to Law No. 9.610/98 – Copyright Law.

Schedule

Presented at the end of this document.

Computer programs
Quantum GIS

Basic bibliography

Ladle, R. J., and R. J. Whittaker. 2011. Conservation Biogeography. Page 301. Blackwell Publishing Ltd, Oxford, UK.

Lomolino, M. V., B. R. Riddle, and J. H. Brown. 2006. Biogeography. Page 846, 3rd edition. Sunderland, MA.

Purvis, A., J. L. Gittleman, and T. Brooks. 2005. Phylogeny and Conservation. Page 431. Cambridge University Press, Cambridge.

Other sources:

Ceballos , G. , Ehrlich , P. R. , Barnosky , A. D. , Garcia , A. , Pringle , R. M. , & Palmer , T. M. (2015). Accelerated modern human – induced species losses: Entering the sixth mass extinction. Advanced Sciences, June, 9–13.

Ficetola , G. F. , Rondinini , C. , Bonardi , A. , Kataria , V. , Padoa-Schioppa , E. , & Angulo , A. (2014). An evaluation of the robustness of global amphibian range maps. Journal of Biogeography, 41(2), 211–221.

Grenyer , R. , Orme , C. D. L. , Jackson , S. F. , Thomas , G. H. , Davies , R. G. , Davies , T. J. , Jones , K. E. , Olson , V. a , Ridgely , R. S. , Rasmussen , P. C. , Ding , T.-S. , Bennett , P. M. , Blackburn , T. M. , Gaston , K. J. , Gittleman , J. L. , & Owens , I. P. F. (2006). Global distribution and conservation of rare and threatened vertebrates. Nature, 444(7115), 93–96.

Holt , B. G. , Lessard , J. P. , Borregaard , M. K. , Fritz , S. a , Araújo , M. B. , Dimitrov , D. , Fabre , P. H. , Graham , C. H. , Graves , G. R. , Jønsson , K. a , Nogues-Bravo , D ., Wang , Z. , Whittaker , R. J. , Mountainså , J. , & Rahbek , C. (2013). An Update of Wallace{\rq}s Zoogeographic Regions of the World. Science, 339, 74–78.

Orme , C. D. L. , Davies , R. G. , Burgess , M. , Eigenbrod , F. , Pickup , N. , Olson , V. a , Webster , A. J. , Ding , T.-S. , Rasmussen , P. C. , Ridgely , R. S. , Stattersfield , A. J. , Bennett , P. M. , Blackburn , T. M. , Gaston , K. J. , & Owens , I. P. F. (2005). Global hotspots of species richness are not congruent with endemism or threat. Nature, 436(7053), 1016–1019.

Richardson , D. M. , & Whittaker , R. J. (2010). Conservation biogeography - foundations, concepts and challenges. Diversity and Distributions, 16, 313–320.

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Other specific articles in pdf on each classroom topic will be made available for download, prior to the start of the course.

Program and schedule

Day	Content	Activity
1	Introduction: What is biodiversity? The challenge of biodiversity metrics.	Article discussion
2	Introduction and general concepts of biogeography. Biogeography as a way of organizing and measuring biological diversity	Article discussion
3	Geographical distributions. Maps and methods. Maps as information syntheses.	Article discussion
4	Geographical distributions: building a database of georeferenced records	Exercise: point locality database
5	Geographical distributions. Practice on how and what to map	Exercise: a map in GIS
6	Geographic distributions. Introduction to distribution modeling	Article discussion
7	Geographical distributions and extinction risk	Article discussion and case studies
8	Biodiversity and surrogacy	Article discussion

Content Details

Lesson 1 – Biodiversity: concepts and metrics. What is biodiversity? The challenge of biodiversity measurements. Biodiversity scales. Extinction, dispersal and in situ speciation. Island biogeography. Habitat loss, species-area relationships and global biodiversity crisis. Linnaean impediment. Wallacean impediment. Global assessments of threat and habitat loss. How to represent biodiversity. Different metrics, different priorities.

Lesson 2 – Biogeography: introduction. Biogeography as a way of organizing biological diversity. First steps: biological nomenclature. Darwin and the evolution of biological diversity. First law of biogeography. Biogeography and scales: stations et habitations. Scales and the classical divisions of biogeography. First steps: dispersal and centers of origin. Continental drift and biogeographic units. Continental drift and a brief history of the Earth. General patterns call for general explanations. Croizat's trilogy: time – space – form. 100 years of Wallace: the legacy. Biogeographic regions as a framework for biogeography. Wallace and the accuracy of describing locations and distributions. Wallace, geographic barriers and Amazonian primates. History of the land and history of lineages. Time, space and form: evolutionary significance of biogeographic regions.

Class 3 – Geographic distributions. Maps and methods. Maps as information syntheses. The first law of biogeography. Wallace, Sclater and the first global map of biological diversity. The Wallacean impediment. Wallacean impediment and opportunities in the 21st century. Mitigating the Wallacean impediment: baseline data. A critique of recent global maps. Museums, herbaria and the Wallacean challenge.

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Distribution maps and errors. Errors and omission and commission and their results in conservation. Map types and sources of errors. Mapping methods and emerging standards.

Class 4 – Data sources and distribution databases. Quality vs. quantity. Basic georeferencing. Gazetteers and georeferencing sources. Literature collection data. Raw data vs. revised data. Building a good database.

Lesson 5. Practical: Using a GIS (Geographic Information System). Vector data: political boundaries, landscape units, hydrography. Raster data: topography. Distribution databases. Plotting and interpreting distributions. Maps as information summaries. Practical questions.

Lesson 6. What determines the distribution of species? Distribution limits and model limits. Niche, movement and interactions. Distribution models. Models and predictions of known and unknown distributions. The research cycle in geographic distributions.

Lesson 7. Geographic distribution and distribution size. Restricted distributions and extrinsic threats. Geographic distribution and IUCN criteria. Extent of occurrence and area of occupancy.

Class 8 – Biodiversity and surrogacy Endemism and biogeographic regions. Zoogeographic regions, biomes and ecoregions. A classification of the world's biogeographic provinces: Udvardy (1975). The Wallacean challenge: how to refine the scale? Wallacean impediment in Tetrapoda. Wallacean impediment and the biodiversity crisis. Birds, Mammals and Amphibians: is that all? Habitat destruction and the biodiversity crisis. Climate change and future geographic distributions. Biodiversity and surrogacy continued. The problem of representativeness: threat, endemism and richness. Representativeness among groups (birds, mammals and amphibians). Does environmental diversity represent biological diversity well? Global Priorities: two central concepts. Biodiversity hotspots. KBAs, vulnerability and irreplaceability. IBAs (Important Bird Areas). Endemic Bird Areas. Endemism: linking biogeography and conservation. Congruent patterns of endemism: a way forward? A new perspective: phylogenetic diversity. Extinction and phylogenetic endemism.

Timetable

Class 1: Wednesday, 27 Nov 2024, 2-6pm PG002

Class 2: Friday, 29 Nov 2024, 2-6pm PG005

Class 3: Monday, 02 Dec 2024, 2-6pm PG006

Class 4: Wednesday, 04 Dec 2024, 2:18pm PG005

Class 5: Thursday, 05 Dec 2024, 2-6pm PG005

Class 6: Wednesday, 11 Dec 2024, 2-6pm PG005

Class 7: Thursday, 12 Dec 2024, 2-6pm PG005

Class 8: Friday, 13 Dec 2024, 2-6pm PG005

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