UNIVERSIDADE DOS AÇORES

Academic Syllabus

1. Name of the course

Natural History of the Azores Islands (Portugal)

2. Work hours /ECTS

Contact hours		Total contact hours	Total hours	ECTS	US Credits
Theoretical	10				
Lab	10				
Seminar	2				
Field work	20	42	150	6	3

3. Professor responsible for the course

Ana Cristina Ricardo Costa

(professors from the several departments of the Faculty of Science and Technology of the University of the Azores will participate in invited lectures in their expertise areas, as well as researchers from different research centers and specialists involved in ongoing projects in Azores, and technicians from local administration)

4. Visiting professor(s)

Erik Zettler (Sea Education Association, Woods Hole, MA)

Linda Amaral-Zettler (Department of Geological Sciences, Brown University, Providence, RI)

5. Pre-requisites

None

6. Learning outcomes

This program provides a panoramic view of Azorean Natural Heritage and will explore emblematic aspects of Azorean biodiversity and environment
By the end of the program, students should:

1. Understand the peculiarities of the natural patrimony and history of the Azores, including its geological origins, oceanographic influences, local biodiversity and environmental threats
2. Recognize and understand the main native plants, animals, and ecosystems in the Azores
3. Understand main forces and mechanisms shaping evolution in the islands of the Azores
4. Understand major threats to habitats and species in the Azores and acknowledge species and ecosystem-based conservation and the socio -economical aspects related to conservation namely public engagement and participation.
5. Understand the Azorean Natural heritage as a driver for sustainable development and planning.

7. Syllabus

I. Natural History of the Azores

1. Origin, Geology and Geodiversity
   - 1.1 Volcanic and geological settings
   - 1.2 Azores geopark
2. Biodiversity
   - 2.1. Native and endemic species
   - 2.2. Introduced and invasive species
3. Island ecology and Biogeography
   - 3.1 Evolution in the Azores: Plants and land snails
   - 3.2 The Azores in the Macaronesian context
   - 3.3 Ecosystems of the Azores
     - Hydrothermal vents
     - Laurel forest
     - Freshwater ecosystems
     - Marine: Coastal ecosystems, Ocean and deep sea
   - 3.4 Habitat Threats, Protected Areas & Restoration Ecology
4. Natural patrimony and sustainable development in the Azores

8. Demonstration of the syllabus' coherence with the course's learning outcomes

The proposed course "Natural History of the Azores Islands", will address learning outcomes 1-5 using an interdisciplinary approach, and familiarize students with basic concepts of geology, ecology, evolution, and biodiversity, and how the relatively young and remote Azores islands provide a unique model for understanding the linkages between these topics. Changes over time, both natural and human-induced, and several case studies of conservation initiative will be discussed. Students will grapple with compromises that must be considered to protect ecosystems using limited resources, while also taking into account human and commercial needs. This aspect will be particularly addressed in syllabus section 4 that will particularly contribute to learning outcomes 4-5.

9. Teaching methodology

The course will include lectures by professors, specialized in different aspects (geologists, botanists, marine biologists, geographers…) and invited speakers (seminars).
Lectures are meant to give a broad overview of the historical and cultural aspects of the Azores as well as and their relationships to natural history. Students will engage with the materials both on an individual basis and via group projects. Additionally, professor will hold regular office hours to discuss all material presented in class and to assist the students with any enrichment materials they wish to research. Attendance to classes is compulsory. In the event a student is unable to attend class, he/she should inform the professor ahead of time and provide a written medical note. Activities outside of lecture including homework assignments and a final project will be required as part of the student evaluation.

Thematic trips are planned namely a whale and dolphin watching trip, a tour to visit the east of the island including a visit to the Priolo project (Azores Bullfinch protection area), where students will learn about the work that is being done to protect this species and the restoration project Laurel forest in which they live. Also visits to the tea factory and pineapple greenhouses are also considered as well as a visit to Furnas to acknowledge the watershed restoration work under progress. The students will also be exposed to local gastronomy and traditions not only in the field trips in São Miguel but also in the planned visit to Santa Maria Island, the first to be discovered and where they will learn about the first human settlements in the islands culture, rural architecture but also the walking trail will lead them to this island's paleontological sites, exclusive to this Island in the Azores.

10. Assessment

Grading is based on: 30% response papers (15% each); 20% attendance and in-class participation; 50% final exam/paper.
Assignment Guidelines: The two response papers should be 2-pages in length (double-spaced, Times New Roman #12). Final Paper should be 6 pages in length, not including bibliography page (double-spaced, Times New Roman #12). Papers may be written in either Portuguese or English. Late response papers will not be accepted, nor will a makeup final exam be given, without a written medical excuse. There will be no tolerance to situations of academic dishonesty and plagiarism.

Please note that students who successfully complete this course and the Portuguese Foreign Language Beginner Course simultaneously get a certificate for Portuguese Foreign Language level B1.

11. Demonstration of the coherence between the teaching methodologies and the learning outcomes

All selected strategies relate to the syllabus, allowing, in due measure, either the introduction of topics through lecture sessions, or further understanding of such topics through readings, discussion, specialist guest presentations, as well as guided tours to Natural History sections of museum Carlos Machado, and other places of relevance to the syllabus.

12. Bibliography

Selections from:

Aguiar, P., & Costa, A. C. (2010). Shallow hydrothermal vents and marine protected areas within the Azores archipelago. *Geographic Technologies Applied to Marine Spatial Planning and Integrated Coastal Zone Management*, 10–14.

Borges, P. A. V., Gabriel, R., Arroz, A. M., Costa, A., Cunha, R. T., Silva, L., … Cardoso, P. (2010). The Azorean Biodiversity Portal: An internet database for regional biodiversity outreach. *Systematics and Biodiversity*, *8*(4), 423–434. http://doi.org/10.1080/14772000.2010.514306

Bullar, J. &H. Bullar (1841) A Winter in the Azores; and Summer at the baths of the Furnas. John Van Voorst London 375pp

Cabral, N., Ferreira, T., & Queiroz, M. (2010). Tsunami hazard assessment for the Azores archipelago: a historical review. *Geophysical Research Abstracts*, *12*, 12792.

Calado, H., Borges, P., Phillips, M., Ng, K., & Alves, F. (2011). The Azores archipelago, Portugal: Improved understanding of small island coastal hazards and mitigation measures. *Natural Hazards*, *58*(1), 427–444. http://doi.org/10.1007/s11069-010-9676-5

Cardoso, P., Borges, P. A. V, Costa, A. C., Tristão, R., Martins, A. M. D. F., Silva, L., … Martins, M. (2008). archipelágica : Azores.

Diogo, H., Gil Pereira, J., & Schmiing, M. (2016). Catch me if you can: Non-compliance of limpet protection in the Azores. *Marine Policy*, *63*, 92–99. http://doi.org/10.1016/j.marpol.2015.10.007

Depledge, M., & Weeks, J. (1992). The Azores: exploitation and pollution of the coastal ecosystem. *Marine Pollution Bulletin …*, *24*(9), 433–435. http://doi.org/10.1016/0025-326X(92)90341-3

Godman, F. (1870), Natural History of Azores or Western Islands. John Van Voorst, London. 358p

Hawkins, S. J., Corte-Real, H. B. S. M., Pannacciulli, F. G., Weber, L. C., & Bishop, J. D. D. (2000). Thoughts on the ecology and evolution of the intertidal biota of the Azores and other Atlantic islands. *Hydrobiologia*, *440*, 3–17. http://doi.org/10.1023/A:1004118220083

Martín, J. L., Cardoso, P., Arechavaleta, M., Borges, P. a V, Faria, B. F., Abreu, C., … Mendonça, E. (2010). Using taxonomically unbiased criteria to prioritize resource allocation for oceanic island species conservation. *Biodiversity and Conservation*, *19*(6), 1659–1682. http://doi.org/10.1007/s10531-010-9795-z

Martins, AMF (2004) The princess' ring: islet of Vila Frnaca do Campo São Miguel, Island. Intermezzo AuioVisuais Lisboa 99p

Morato, T. (1997). The Azores Archipelago , 1997. *Atlantic*, 241–270.

Morton, B. J. Britton & A. Frias Martins (1998), Coastal Ecology of the Acores. Sociedade afonso Chaves. Ponta Delgada. 249 pp

Morton, B., & Britton, J. C. (2000a). Origins of the Azorean Intertidal Biota: the Significance of Introduced Species, Survivors of Chance Events. *Arquipélago. Life and Marine Science*, *2*, 29–51.

Morton, B., & Britton, J. C. (2000b). The origins of the coastal and marine flora and fauna of the Azores. *Y Oceanography and Marine Biology*, *38*, 13–84.

Nunes, J, S. Silva, J Barcelos (2012) Darwin in the Azores: his personal dairy with commentaries Observatório do mar dos Açores. Horta. 81p

Pham, C. K., Canha, A., Diogo, H., Pereira, J. G., Prieto, R., & Morato, T. (2013). Total marine fishery catch for the Azores (1950-2010). *ICES Journal of Marine Science*, *70*(3), 564–577. http://doi.org/10.1093/icesjms/fst024

Rodrigues, L. (2007), Marine species of the Azores with commercial value. Associação Marítima Açoriana. Ponta Delgada. 239p

Santos, R. S., Hawkins, S., Monteiro, L. R., Alves, M., & Isidro, E. J. (1995). Marine research, resources and conservation in the Azores. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *5*(September 1994), 311–354.

All books and readings will be provided by the Professors.
Recommended book:
Portuguese/English Dictionary