11:375:380 Tropical Environments and Society

[Cross-listed with 01:381:371 Topics in Environmental Studies for SAS students]

General Course Information

Offered: Spring 2020
Instructors: Benjamin Lintner (Environmental Sciences; lintner@envsci.rutgers.edu), Xenia Morin (Plant Biology; xenia.morin@rutgers.edu), Laura Schneider (Geography; laura.schneider@rutgers.edu), Lena Struwe (Ecology, Evolution, and Natural Resources & Plant Biology; lena.struwe@rutgers.edu)
Meeting Times/Locations: TBD
Credits: 4

Requirements

A special permission number (SPN) is required to enroll. Prior to requesting an SPN, students are required to submit an application to Rutgers Global study abroad programs for the field component. Note that there are costs beyond standard tuition and fees for the field component (travel, lodging, etc.), but ***financial support is available***.

Catalog Description

This course addresses contemporary challenges facing the environments and people of the tropics, including climate change, threats to ecosystem function and biodiversity, deforestation, and agriculture and food security. In addition to the regular lecture, students will participate in a field component during Spring Break during which students will engage in targeted research to gain deeper understanding of the challenges and research opportunities in tropical systems.

Extended Course Description

This transdisciplinary course addresses a range of topics relevant to understanding some of the key contemporary challenges facing the environments and people of the tropics, e.g., anthropogenic climate change, threats to ecosystems and their biodiversity, pressures associated with deforestation and other land use changes, agriculture and food security, among others. The course consists of both a lecture-based component, to be held during the spring semester, and a field component, to take place during Spring Break. In the lectures, students will develop a solid foundation for critical analysis of these challenges, both in a pan-tropical context as well as specific to the site of the field component. During the field component, students will engage in targeted research and data collection to gain a deeper appreciation of the challenges and opportunities in tropical systems.

Course Learning Goals and Assessment

1. Develop a foundation for critical interdisciplinary analysis of challenges facing tropical environments and people in a pan-tropical context and specific to the field site
2. Synthesize and communicate results and findings from contemporary literature relevant to the challenges facing tropical environments and people
3. Perform field research and data collection and analyze and present results

Goal #1 *will be assessed through written responses assigned as in-class exercises, student-led reading discussions, and a final course presentation.* ***Goal #2*** *will be assessed through student-led in-class discussion of reading materials.* ***Goal #3*** *will be assessed through a field site research journal and a post field site report of findings.*

These course learning goals map on to several learning goals of the Environmental Sciences (ES) undergraduate program. ***Goal #1*** addresses the ES programmatic learning goal of ***"7. [understanding] contemporary environmental science issues and the impact of environmental science in a global and societal context."*** Goal #2 addresses the ES programmatic goal of ***"5. communicat[ing] technical information effectively (orally, in writing, and through electronic media)."*** ***Goal #3*** addresses the ES programmatic goals of ***"1. apply[ing] knowledge from the sciences and mathematics to environmental problems and solutions"*** and ***"3. design[ing] and conduct[ing] experiments, and analyz[ing] and interpret[ing] data."***

Course Materials and Website

Readings from peer-reviewed literature and selected texts will be assigned. A tentative reading list appears below. Selected course materials will be posted to the course website on Rutgers Canvas.

Grading

- In-class written responses [20%]
- Student-led reading discussions [20%]
- Field research journal [10%]
- Field research report [25%]
- Course presentation [25%]

The in-class written responses will be assigned periodically at the beginning of lecture. Students will be prompted to respond to a question to assess comprehension of course material. Each student will be tasked with leading a specific discussion of assigned reading materials, and all students are expected to participate in these discussions. Students will be required to keep a research journal from the field site visit and prepare a report of field research findings. Students will also carry out research on a topic of their choosing to present in class at the end of the semester. While this topic need not relate to the field site visit, we hope the visit will inspire and motivate a desire for further investigation!

Field Site Visit

During Spring Break, we will visit La Selva Research Station, a world-class 1600-hectare Costa Rican research facility comprising both old-growth and recovering tropical Caribbean humid lowland forest. Founded in 1968 by the Organization for Tropical Studies, La Selva affords us an opportunity to explore the interface between natural and human systems. As instructors, we hope you will find the field experience to be thrilling and transformative, but we remind you that while abroad, we are guests of a foreign country and ambassadors of Rutgers. Detailed field site orientation and instructions about travel, safety, and conduct will be provided prior to and during our visit.

Attendance

Students are expected to attend all lectures. If you expect to miss a lecture, please use the absence reporting website (https://sims.rutgers.edu/ssra/) to indicate the data and reason for the absence; this website will generate an email alerting the instructors of your absence. Students are expected to make up all graded elements missed during an absence.

Academic Integrity

Students in this course are expected to adhere to all elements of the Rutgers Academic Integrity Policy—please see: http://academicintegrity.rutgers.edu for the current version of this policy as well as academic integrity resources.

Students with Disabilities

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete a registration form available from https://webapps.rutgers.edu/student-ods/forms/registration.

Tentative Schedule

Week	Topics
Week 1	Overview and introduction; Study abroad orientation
Week 2	Climate in the Tropics: Past, Present, and Future
Week 3	Ecosystems of the Tropics
Week 4	Ecology and biodiversity of the Tropics; Class fieldtrip to Floriculture greenhouse

Week 5	Research methods and tools: hypothesis building, collection metrics and tools
Week 6	Patterns and history of land use/land cover change in the Tropics
Week 7	Food and agricultural systems of the Tropics; Class fieldtrip to research greenhouse)
Week 8	Research methods and tools: field site instrumentation, GIS, and remote sensing
Week 9	Field site visit!
Week 10	Debriefing of field site visit; Data analysis, mapping
Week 11	Climate change effects on society; Sustainable Development Goals
Week 12	Policy and legal framework, interdisciplinary connectivity and societal impacts and change
Week 13	In class preparation of field research report
Week 14	In class preparation of field research report
Week 15	Presentations

Reading Materials

Books

Forsyth, A., and K. Miyata. *Tropical Nature: Life and Death in the Rain Forests of Central and South America*. New York City: Simon & Schuster, 248 p, 1995.
[17 short essays on ecology, biology, and natural history in the Neotropics]

Kricher, J. *The New Neotropical Companion*. Princeton, NJ: Princeton University Press, 432 p, 2017.
[Reference on tropical ecology and biology]

Peer-reviewed Journal Articles

Brown, J. H. Why are there so many species in the tropics? *Journal of Biogeography, 41*, 8– 22, https://doi.org/10.1111/jbi.12228, 2014.

DeFries, R., K. Karanth, and S. Pareeth. Interactions between protected areas and their surroundings in human-dominated tropical landscapes. *Biological Conservation, 143,* 2870–2880, 2010.

Gibson L., T. M. Lee, L. P. Koh, B. W. Brook, T. A. Gardner, J. Barlow, et al. Primary forests are irreplaceable for sustaining tropical biodiversity. *Nature, 478*, 378, 2011.

Laurance W. F., J. Sayer, and K. G. Cassman. Agricultural expansion and its impacts on tropical nature. *Trends in ecology & evolution, 2,* 107–16, 2014.

Lambin, E. F., H. J. Geist, and E. Lepers. Dynamics of Land-Use and Land-Cover Change in Tropical Regions. *Annual review of environmental resources, 28*, 205-241. https://doi.org/10.1146/annurev.energy.28.050302.105459, 2013.

Lawrence, D., and K. Vandecar. Effects of tropical deforestation on climate and agriculture. *Nature Climate Change*, *5*, 27−36, doi:10.1038/nclimate2430, 2014.

Scherr, S. J., and J. A. McNeely. Biodiversity conservation and agricultural sustainability: towards a new paradigm of 'ecoagriculture' landscapes. *Philosophical Transactions of the Royal Society B - Biological Sciences* . https://doi.org/10.1098/rstb.2007.2165, 2008.

Reports

Food and Agricultural Organization of the United Nations and Pan American Health Organization. *Panorama of Food and Nutrition Security in Latin America and the Caribbean*. Santiago de Chile, 2017.
http://www.fao.org/3/a-i7914e.pdf

Intergovernmental Panel on Climate Change. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 p, 2013.
https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf
[Selected sections pertaining to the Tropics, such as Chapter 14]

United Nations Sustainable Development Goals
https://sdgactioncampaign.org/wp-content/uploads/2017/07/TheSustainableDevelopmentGoalsReport2017.pdf