

## **Environmental Research Methods and Ethics** ENVI-3500 (3 credits)

### **Tanzania: Climate Change and Sustainability from Mount Kilimanjaro to Zanzibar**

*This syllabus represents a typical semester. Because courses develop and change over time to take advantage of unique learning opportunities, actual course content varies from semester to semester.*

#### **Course Description**

This summer research methods course prepares students for the exciting challenge of conducting research in diverse cultural and ecological settings. By introducing ecological and anthropological field techniques, course content emphasizes understanding the human-environment context as fundamental to comprehending ecosystems, climate change, and people. The course teaches skills and integrates field observations, field activities, interviews, presentations, and written assignments. Students gain familiarity with record-keeping, scientific analysis, interpretation, and presentation based on primary sources. Through carefully designed excursions and field assignments, students will learn to critically apply scientific and social scientific methods appropriate to the program theme and conducive to feasible, ethical research in diverse settings.

#### **Learning Outcomes**

Upon completion of the course, students will be able to:

- Identify and describe key ecological and anthropological field techniques in cross-cultural environmental research.
- Examine the relationships between human activities and environmental changes in Tanzania, focusing on climate change impacts, adaptations, and mitigations.
- Conduct appropriate and ethical field observations, interviews, and data collection activities in Tanzanian ecosystems and communities.

#### **Language of Instruction**

This course is taught in English, but students will be exposed to local vocabulary related to course content through in-country expert lectures and field visits in a wide range of venues and regional locales.

#### **Instructional Methods**

Students participate in field-based activities and reflexive discussions to learn the methods and ethics appropriate to Tanzania's climate change and sustainability theme. Students apply natural and social science concepts, skills, and methods learned in the course. The academic director evaluates student participation and assignments based on timeliness, completeness,

depth of thought, clarity of organization, application of skills and methods, quality of primary data, analysis depth, argument coherence, and ethical practice.

### **Required Texts**

See the course schedule for a full listing.

### **Assignments and Evaluation**

#### Assignment Descriptions and Grading Criteria

##### 1) Systemic Detailed Journal Entries (40%)

The Systemic Journal Entries are a comprehensive document prepared in Word detailing the data collection methods (marine and terrestrial environments) you have learned during class sessions or field excursions. The journal should be systematically written with three main sections. These are the **preliminary pages** [page cover (title, AD's name, Name of the student, sending school name, major name, and declaration statement) and page of content, list of figures/table all of these should be automated], the **main body** detailing a brief description of each method (categorized as either social science or natural science methods) and when it is appropriate to use the method, merits and demerits of each method and the **conclusion** which should be based on what things to consider when selecting a suitable data collection method for research project. **References:** All works cited in the main text should appear here under the reference list and be written correctly in APA format.

##### 2) Reflective Essays (25% each; 50%)

In all three modules, students in their small field study teams will participate in all planned academic activities, including excursions, field visits, interviews with local communities, presentations, lectures, and discussions. They will also collect, analyze, interpret, and present primary field data. At the end of each module, students write a reflective essay connecting their personal experience to course content. The reflective essay format is structured into an introduction, body, and conclusion. Within the essay, the students should work to convey the most important lesson learned from the experience. Module I will form the basis of understanding the two reflective essays; thus, after completing this module, the AD will lead the reflection session to prepare the students for the two graded reflective essays.

##### 3) Participation (10%)

This includes active involvement in lectures, readings, discussions, and excursions using the following criteria:

- Attendance - promptness to class and positive presence in class.
- Active Listening - paying attention in class and during field excursions, asking appropriate questions, showing interest and enthusiasm (this includes body language), entertaining contradictory perspectives, taking notes.
- Involvement in Class Discussions - either in small or large groups, sharing knowledge. This means challenging yourself to speak up if you usually don't, and also means allowing others to speak if you are a person who tends to dominate class discussions.

- Group Accountability – positive participation in the group during field excursions and classes; not keeping others waiting.
- Displaying Respect – culturally appropriate interaction with hosts, SIT program staff, SIT lecturers and communities.

Assessment

- Systematic Detailed Journal Entries - 40%
- Reflective Essay for Module 2 - 25%
- Reflective Essay for Module 3 - 25%
- Participation - 10%

Attendance and Participation

Due to the nature of SIT Study Abroad programs, and the importance of student and instructor contributions in each and every class session, attendance at all classes and for all program excursions is required. Criteria for evaluation of student performance include attendance and participation in program activities. Students must fully participate in all program components and courses. Students may not voluntarily opt out of required program activities. Valid reasons for absence – such as illness – must be discussed with the academic director or other designated staff person. Absences impact academic performance, may impact grades, and could result in dismissal from the program.

Late Assignments

SIT Study Abroad programs integrate traditional classroom lectures and discussion with field-based experiences, site visits and debriefs. The curriculum is designed to build on itself and progress to the culmination (projects, ISP, case studies, internship, etc.). It is critical that students complete assignments in a timely manner to continue to benefit from the sequences in assignments, reflections and experiences throughout the program. Example: Students may request a justified extension for one paper/assignment during the semester. Requests must be made in writing and at least 12 hours before the posted due date and time. If the reason for the request is accepted, an extension of up to one week may be granted at that time. Any further requests for extensions will not be granted. Students who fail to submit the assignment within the extension period will receive an ‘F’ for the assignment.

Grading Scale

94-100%	A
90-93%	A-
87-89%	B+
84-86%	B
80-83%	B-
77-79%	C+
74-76%	C
70-73%	C-

67-69%	D+
64-66%	D
below 64	F

### Program Expectations

- Show up prepared. Be on time, have your readings completed and points in mind for discussion or clarification. Complying with these elements raises the level of class discussion for everyone.
- Have assignments completed on schedule, printed, and done accordingly to the specified requirements. This will help ensure that your assignments are returned in a timely manner.
- Ask questions in class. Engage the lecturer. These are often very busy professionals who are doing us an honor by coming to speak.
- Comply with academic integrity policies (no plagiarism or cheating, nothing unethical).
- Respect differences of opinion (classmates', lecturers, local constituents engaged with on the visits). You are not expected to agree with everything you hear, but you are expected to listen across difference and consider other perspectives with respect.

### SIT Policies and Resources

Please refer to the [SIT Study Abroad Handbook](#) and the [Policies](#) section of the SIT website for all academic and student affairs policies. Students are accountable for complying with all published policies. Of particular relevance to this course are the policies regarding: academic integrity, Family Educational Rights and Privacy Act (FERPA), research and ethics in field study and internships, late assignments, academic status, academic appeals, diversity and disability, sexual harassment and misconduct, and the student code of conduct.

Please refer to the SIT Study Abroad Handbook and SIT website for information on important resources and services provided through our central administration in Vermont, such as [Library resources and research support](#), [Accessibility Services](#), [Counseling Services](#), [Title IX information](#), and [Equity, Diversity, and Inclusion](#) resources.

### Course Schedule

*\*Please be aware that topics and excursions may vary to take advantage of any emerging events, to accommodate changes in our lecturers' availability, and to respect any changes that would affect student safety. Students will be notified if this occurs*

This course takes the form of topical modules that incorporate activities and assignments:

#### **Module 1: Climate Change and Sustainability - Human Communities (Sambaa & Chagga) and Terrestrial Environments** (Usambara Mountains and Mt. Kilimanjaro ecosystem)

This module examines the interactions and interdependence between communities and nature in the unique terrestrial ecosystems of the Usambara mountain forests and Mount Kilimanjaro, the highest mountain on the African continent, under the influence of land use and climate

change. Students examine the effects of land use and climate change on these unique ecosystems, articulating the theoretical and practical learning through reading of peer-reviewed papers and presentations by faculty and guest lecturers/experts to introduce the climatology and the ecology of mountain ecosystems and associated anthropogenic threats, including short field visits. The module introduces students to mountainous hotspot ecosystems, associated threats, and the interactions and interdependence of human communities in these ecosystems.

#### Required Readings:

Mwalusepo, S., & Massawe, S, et al. (2015). Smallholder Farmers' Perspectives on Climatic Variability and Adaptation Strategies in East Africa: The Case of Mount Kilimanjaro in Tanzania, Taita and Machakos Hills in Kenya. *Journal of Earth Science & Climatic Change*, 06(10). <https://doi.org/10.4172/2157-7617.1000313>

Sébastien, L. (2010). The Chagga people and environmental changes on Mount Kilimanjaro: Lessons to learn. *Climate and Development*, 2(4), 364–377. <https://doi.org/10.3763/cdev.2010.0055>

Said, M., Komakech, H. C., Munishi, L. K., & Muzuka, A. N. N. (2019). Evidence of climate change impacts on water, food and energy resources around Kilimanjaro, Tanzania. *Regional Environmental Change*, 19(8), 2521–2534. <https://doi.org/10.1007/s10113-019-01568-7>

#### **Module 2: Climate Change and Sustainability - Human Communities and Terrestrial Environments** (Hadzabe, Datoga, and Maasai communities in Lake Eyasi and Natron in Loliondo, Ngorongoro)

This module examines climate change's impact on terrestrial landscapes, associated plant and animal communities, and the indigenous community. Students investigate the influences of heightened climate change on the livelihoods of hunters and gatherers, the Hadza and the Datoga in the Lake Eyasi, at Mangula district and the agropastoral community, the Maasai at Engaresero village, Lake Natron, and Arash in Loliondo within Ngorongoro. During these excursions, this module provides students in small teams with opportunities to engage with social science research methods, including participant observation and interview surveys to collect, analyze, interpret, and present primary data. Further, students will visit the Ngorongoro-Serengeti N. Park ecosystem and appreciate the impacts of heightened climate change on migrating and grazing wildlife species such as wildebeests and zebras and its influences on forage resource distribution and availability.

#### Required Readings:

Nnko, H. J., Gwakisa, P. S., Ngonyoka, A., & Estes, A. (2021). Climate change and variability perceptions and adaptations of pastoralists' communities in the Maasai Steppe, Tanzania. *Journal of Arid Environments*, 185, 104337.  
<https://doi.org/10.1016/j.jaridenv.2020.104337>

Shadrack, S., & Mwalilino, J. K. (2022). Hunter-gatherers' coping strategies on climate change and prospect in Iramba and Mbulu Districts, Tanzania. *International Journal of Tropical Drylands*, 6(2). <https://doi.org/10.13057/tropdrylands/t060204>

Kupika, O. L., Gandiwa, E., Kativu, S., & Nhamo, G. (2017). Impacts of Climate Change and Climate Variability on Wildlife Resources in Southern Africa: Experience from Selected Protected Areas in Zimbabwe. *Selected Studies in Biodiversity*.  
<https://doi.org/10.5772/intechopen.70470>

### **Module 3: Climate Change and Sustainability - Human Communities and Marine Environments** (Zanzibar Archipelago)

This module addresses climate change's impact on the environment and human communities on Unguja Island. It further addresses resilience strategies for people who depend on marine environments. The module introduces key marine environmental research methods. It engages students in the impacts of climate change on seawater rise, shorelines, mangrove forests, seagrass beds, beach erosion, and coral reefs. Field visits and site activities, readings, and discussions with experts emphasizing field equipment, geological techniques, plant and fish census techniques for measuring biodiversity impacts, and, for corals, and basic coral surveying to investigate broad and long-term climate change. Small teams of students collect, analyze, and present primary field data. In addition, students work with the Institute for Marine Sciences in Zanzibar to interview community members about collaborative solutions to coastal climate change and to learn basic scientific techniques and tools for mitigation (indicators, impacts, adaptation strategies, resilience, mgt regime of the area contemporary issues, policy, and politics).

Readings – *Please note these readings are cross-listed in the ENVI-3000 course. In this module, we focus on the methods/methodologies and research questions used in each study appropriate to this course's focus on research methods and ethics.*

de la Torre-Castro, M., Lindström, L., Jiddawi, N., Pike, F., & Max, A. (2022). Women and adaptive capacity to climate change in East African seascapes – Zanzibar as an example. *Frontiers in Marine Science*, 9(931883).  
<https://doi.org/10.3389/fmars.2022.931883>

Edwards, A. J. (2021). Impact of climatic change on coral reefs, mangroves, and tropical seagrass ecosystems. In *Climate Change Impact on Coastal Habitation* (pp. 209–234). CRC Press.

Makame, M., Shackleton, S., & Filho, W. (2021). Coping with and Adapting to Climate and Non-Climate Stressors Within the Small-Scale Farming, Fishing and Seaweed Growing Sectors, Zanzibar. *Research Square (Research Square)*, 1–26.  
<https://doi.org/10.21203/rs.3.rs-1083174/v1>