CIEE Monteverde, Costa Rica

Course title: Sustainability: Environment, Economy, and Society
Course code: ENVI 3001 MTVE
Programs offering course: Sustainability and the Environment
Language of instruction: English
U.S. semester credits: 4.00
Contact hours: 60.00
Term: Spring 2021

Course Description

The United Nations World Commission on Environment and Development (1987), in its seminal publication of the Brundtland Report, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The conceptual framework proposed to the global community therein was the first to articulate the importance of evaluating development based upon its concomitant environmental, economic and social merit, or what is now commonly referred to as the triple bottom line. This course introduces the interdisciplinary concept and practice of sustainable development and explores contemporary development issues drawing from examples in the Monteverde region, throughout Costa Rica, and around the world. We focus on "systems thinking" and the principal systems that we explore are energy systems, food systems, aquatic ecosystems, international trade and tourism systems all under the framework of system resilience.

Learning Objectives

By completing this course, students will:

- Analyze the concept of planetary boundaries and Global Change in the social, economic and environmental context of the tropics.
- Analyze, critique, and debate the resilience and adaptability of critically important economic, social, and environmental systems of Costa Rica. Examples include: energy systems, water systems, food systems, international travel and tourism systems.
- Deconstruct major trends and driving forces associated with urbanization, population growth, poverty, and environmental justice in Costa Rica and debate ideas for steering trends toward greater sustainability.
- Deconstruct the conditions that drive expansion in energy, agriculture, and tourism in Costa Rica.
- Critically judge whether eco-tourism, agriculture, and energy production undermine or enhance the protection of biodiversity in Monteverde.
- Analyze and articulate the potential for eco-tourism, agriculture, and energy production as a poverty-reduction strategy for different sectors of Costa Rican societies, including indigenous communities.
- Integrate knowledge of energy production, agriculture, and tourism in Costa Rica with principles of planetary boundaries to assess Costa Rica’s overall global impact on Global Change.
- Critically assess whether Costa Rican common pool resources, including fisheries and clamming industries are being adaptively governed, Ostrom (2008).
- Judge whether incentive programs such as sustainability certification in tourism, agriculture, and forest products advance sustainability and propose improvements.
- Compare and contrast cradle-to-grave versus cradle-to-cradle production principles; identify and critically assess life cycle stages for common household products; draw parallels between natural cycles and cradle-to-cradle production; explain the shortcomings of the cradle-to-cradle paradigm.

Course Prerequisites

None.

Methods of Instruction

This course is taught through the use of lectures, readings, field visits, interviews, surveys, group discussions, debates, and written assignments. Field excursions in Monteverde, throughout Costa Rica, and into Panama provide opportunities to link theory with practice plus engage stakeholders in discussion. Completing the required
text and readings is an essential component to the individual and collective learning experience of this course and is expected. You should have copies of the required textbooks for their own use. A course folder (binder), containing the additional readings (listed above), is in the CIEE Study Center student. PowerPoint lectures are maintained on the CIEE Study Center student computers.

**Assessment and Final Grade**

1. Worksheets  
   20%
2. Midterm Exam  
   20%
3. Final Exam  
   20%
4. Quizzes  
   30%
5. Classroom & Field Participation  
   10%

TOTAL  
100%

**Course Requirements**

**Worksheets**

There will be take-home assignments in the form of worksheets (including short answer and essay questions) regarding each unit of the course.

**Midterm Exam**

You will take a 100-point exam consisting of multiple choice, short answer, and essay questions on materials related to the lectures, field activities, and assigned readings. Lectures, discussions, activities, and readings that are included on the midterm are indicated in the schedule below, as is a set of midterm review questions.

**Final Exam**

You will take a 100-point exam consisting of multiple choice and short essay questions on materials related to the lectures, field activities, discussions, and assigned readings. Lectures, activities, discussions, and readings that are included on the final exam are indicated in the schedule below.

**Quizzes**

You will take a total of 5 quizzes. The first half of each quiz will be made of short answer and true/false questions to be answered in class.

**Classroom & Field Participation**

Attendance and participation is noted for each lecture, discussion, and field activity. Points are earned for thoughtful commentary, questions, and overall engagement.

**Attendance**

Regular class attendance is required throughout the program, and all absences will result in a lower participation grade for any affected CIEE course. Due to the intensive schedules for Open Campus and Short Term programs, absences that constitute more than 10% of the total course will result in a written warning.

Students who transfer from one CIEE class to another during the add/drop period will not be considered absent from the first session(s) of their new class, provided they were marked present for the first session(s) of their original class. Otherwise, the absence(s) from the original class carry over to the new class and count against the grade in that class.

For CIEE classes, excessively tardy (over 15 minutes late) students must be marked absent.

Attendance policies also apply to any required co-curricular class excursion or event, as well as to any required field placement. Students may not miss placement/work hours at an internship or service learning site unless approved in advance by the Academic Director and placement supervisor. All students must complete all of the requisite 100 minimum work hours on site at the internship or service learning placement to be eligible for academic credit.

Students who miss class for personal travel, including unforeseen delays that arise as a result of personal travel, will be marked as absent. No make-up or re-sit opportunity will be provided.

Attendance policies also apply to any required class excursion, with the exception that some class excursions
cannot accommodate any tardiness, and students risk being marked as absent if they fail to be present at the appointed time.

Absences for classes will lead to the following penalties:

<table>
<thead>
<tr>
<th>Percentage of Total Course Hours Missed</th>
<th>Minimum Penalty</th>
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<tbody>
<tr>
<td>Up to 10%</td>
<td>Participation graded as per class requirements</td>
</tr>
<tr>
<td>10 – 20%</td>
<td>Participation graded as per class requirements; 3% grade penalty &amp; written warning</td>
</tr>
<tr>
<td>More than 20%</td>
<td>Automatic course failure, and possible expulsion</td>
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</tbody>
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N.B. Course schedule is subject to change due to study tours, excursions, or local holidays. Final schedules will be included in the final syllabus provided to students on site.

**Weekly Schedule**

**Week 1**

Class: 1.1 Orientation to the Program / Introduction to Sustainability & the Anthropocene

Lecture: “Concepts and Indicators of Sustainability”. The 3 pillars of sustainability, the Brundtland Report definition, intergenerational equity, Rio Declaration of rights and responsibilities; Doughnut economics; I = PAT; ecological footprints; ecological overshoot.

Readings:


Raworth, K. (2018)


Bryant, B. (2015)

IPCC (2018)

Class: 1.2 Lecture: Global Change / Trends in the Age of the Anthropocene

Population growth worldwide and in CR; rural-urban; Demographic transitions; Planetary Boundaries: climate change, ocean acidification, novel entities, ozone depletion, atmospheric loading, biogeochemical flows, freshwater use; land systems change; biosphere integrity, Environmental justice.

Class: 1.3 Lecture: Global Change / Trends in the Age of the Anthropocene

Population growth worldwide and in CR; rural-urban; Demographic transitions; Planetary Boundaries: climate change, ocean acidification, novel entities, ozone depletion, atmospheric loading, biogeochemical flows, freshwater use; land systems change; biosphere integrity, Environmental justice.

Discussion: The Anthropocene debate.
Class: 1.4 Lecture: Resilience & Systems Thinking

Systems thinking, complex adaptive systems, adaptive cycle, socio-ecological systems, characteristics of resilient systems.

Class: 1.5 Excursion: Visit to La Carpio Landfill & Community

Class: 1.6 Discussion: Environmental Justice in Landfill Communities

Readings:
Walker & Salt (2006)

Week 2
Class: 2.1 Common Pool Resources

Definitions and examples of commons, common pool resources, stakeholder mapping, subtractable resources, and the tragedy of the commons; governance vs. adaptive governance; requirements (and enhancing factors) for adaptive governance of common pool resources and for creating institutional sustainability; examples of CPRs from Costa Rica; case studies of clamming and fishing associations of Isla de Chira, learn to do a rapid resilience evaluation.

Class: 2.2 Excursion: Field Trip to Chira Island & Fishing Community

Interviews with key informants about the community managed resources.

Class: 2.3 Discussions & Assignment

Sustainability of the Palito Fisher’s association

Assignment 1: Application of Ostrom’s requirements for adaptive management to Chira’s fisher’s association.

Class: 2.4 Assessment (in class)

Quiz 1: Covers readings to date

Week 3
Class: 3.1 Sustainable Energy Production


Readings:
Partridge, W.L. (1993)

Class: 3.2 Lecture: Hydropower


Class: 3.3 Lecture: Wind Energy

Basic mechanics, types of wind turbines, trends and changes in technology, impacts wind farms, Case studies Costa Rica (CDM, carbon trading and BOT modality).

Class: 3.4 Excursion: Visit to Hydroelectric Plant
Discussion: Sustainability of the Arenal hydropower plant project

Class: 3.5 Excursion: Visit to Wind Farm

Class: 3.6 Discussion: Challenge of Switching from Fossil Fuels to Renewable Energies

Class: 3.7 Assessment (in class)

Quiz 2: Covers readings

**Week 4**

Class: 4.1 Sustainable Energy Production, continued

Lecture. “Geothermal power”. Basic mechanics, types of geothermal turbines, trends and changes in technology, Impacts and limitations of geothermal energy, Case study: Costa Rica.

Class: 4.2 Lecture: Solar Energy

Basic mechanics, types of solar energy available, trends and changes in technology, Impacts and limitations of solar energy, solar energy storage, Costa Rica’s solar potential and solar plans.

Class: 4.3 Excursion: Visit to Geothermal Plant

Class: 4.4 Excursion: Visit to Solar Plant

Class: 4.5 Excursion: Visit to Rincon de La Vieja National Park

Class: 4.6 Discussion: Sustainability of Using National Parks for Energy Production

Assignment. Sustainability evaluation of electric production technologies.

**Week 5**

Class: Midterm Exam

**Week 6**

Class: 6.1 Fresh Water Resources & Sustainable Tourism in the Tropics

Lecture. “Freshwater Resources in Costa Rica: Legal framework for freshwater use and protection; management and distribution of freshwater in city and rural settings; freshwater consumption by sector; water footprints of important Costa Rican crops; freshwater conflicts in Costa Rica and Monteverde; treatment and disposal of grey and black water in city and rural settings; water use in relation to tourism development. Previously students should interview their homestay families about where their water comes from, where does their waste water go to? And whether they perceive there is a water problem (drinking and waste waters) in Costa Rica.

Readings:

Honey (2008)

Davis (2009)

Class: 6.2 Lecture: Tourism

Global Trends and Costa Rican Trends. Eco-, agro-, rural, and mass tourism defined and distinguished; tourism treadmills explained with examples from Costa Rica; history of tourism and conservation in Monteverde; introduction to MV’s original watershed, Monteverde Cloud Forest Preserve, Children’s Eternal Rainforest, Monteverde Conservation League; tourism infrastructure in MV; use, abuse, and protection of local resources; impacts of visitation on the human community; tourism certification; third party versus first party certification; green-washing; certification pitfalls, myths, and impacts on consumer psychology, especially in context of eco-tourism.
Class:  6.3  Excursion: Visit to Monteverde Cloud Forest Reserve

Class:  6.4  Excursion: Visit to Certified Sustainable Hotel

Class:  6.5  Documentary & Discussion

  Discussion. Tourism and freshwater issues in Costa Rica.

Class:  6.6  Documentary & Discussion

  Documentary. Gringo Trails (2012)
  Discussion. Can tourism really be sustainable?
  Assignment. Sustainable tourism assessments.

Class:  6.7  Assessment in Class

  Quiz 3: Covers readings

**Week 7**

Class:  No SEES Classes

**Week 8**

**Class:  8.1  Food Production**

  Lecture. "Food Security, community food security, food sovereignty". Food production, famine, and food availability in the tropics; the Green Revolution; concepts of food security, community food security, and food sovereignty compared; rise of transnationals and corporate agriculture. Coffee and food security.

  Readings:
  Clapp, J. (2010)
  Chappell, M. J., et al. (2013)

**Class:  8.2  Lecture: Conventional Agriculture in the Tropics**

  Legacy of the green revolution. Industrialized agriculture, synthetic fertilizers, synthetic pesticides (POPs), GMO's. Banana and pineapple farming in Costa Rica.

**Class:  8.3  Lecture: Livestock Production**

  Why livestock? Why not livestock? World trends in animal product consumption. Impact mitigation. History of dairy farming in Costa Rica and in Monteverde; dairy cattle-pig connection; water and carbon footprints, waste water, and other environmental impacts of large and small dairy and pig production systems; economics of dairy and pig farming in Monteverde; livestock husbandry in CAFO's contrasted with traditional Monteverde farms.

**Class:  8.4  Excursion: Visit to Integrated Livestock Farm**

  Discussion: Ethics of meat eating.

**Week 9**

Class:  9.1  Food Production, continued

  Excursion: Visit to traditional coffee farm
Discussion: Future of coffee production?

Class: 9.2 Excursion: Visit to Organic Farm

Class: 9.3 Presentation (Assignment)
Presentations to decision makers on climate smart practices for Monteverde.

Class: 9.4 Assessment (in class)
Quiz 4: Covers readings

Week 10
Class: No SEES Classes

Week 11
Class: 11.1 Food & Forests
Lecture. “Agroforestry”. Agroforestry production basics; agroforestry contrasted with permaculture; history and trends in cacao production and consumption; Monilia infections; livelihood analysis for Talamanca cacao farmers; BriBri cacao production.

Readings:
Shaver et al. (2015)
Dahlquist et al. (2007)

Class: 11.2 Lecture: Alternative Agricultural Practices
Overview of alternative farming trends. Organic agriculture, permaculture, hydroponics and vertical farming. Benefits and impacts of each type of agriculture. How are pests managed and where do fertilizers come from in this type of agriculture.

Class: 11.3 Excursion: Visit to Permaculture Farm

Class: 11.4 Excursion: Visit to Fair-Trade Banana Coop in Panama
Discussion. Fair trade in industrialized agriculture.

Week 12
Class: 12.1 Food & Forests, continued
Excursion. Visit to Traditional Cacao plantation in Bribri Indigenous Territory
Discussion. Food security and resilience in Bribri agroforestry.

Class: 12.2 Excursion: Visit to Organic Pineapple Plantation in the Atlantic Lowlands
Discussion. How sustainable is organic pineapple?

Week 13
Class: 13.1 Food & Forests, continued
Assignment (in class): Creating a sustainability evaluation for food production systems.

Week 14
Class: 14.1 Circular Economies / Final Exam
Lecture. “Introduction to circular economies in theory and practice”.
Quiz 5 on Cradle to Cradle book.
Readings:
McDonough & Braungart (2002)

Class: 14.2 Lecture & Quiz

"Great problems great solutions”. Course wrap up.

Class: 14.3 Final Exam

**Course Materials**

**Readings**


IPCC (2018) Global warming of 1.5oC: Summary for Policymakers. Intergovernmental Panel on Climate Change, Pp. 6-19.


**Online Resources**
Raworth, K. (2018) A healthy economy should be designed to thrive, not grow. https://www.ted.com/talks/kate_raworth_a_healthy_economy_should_be_designed_to_thrive_not_grow