CIEE Monteverde, Costa Rica

Course title: Global Change and the Environment
Course code: (GI) ENVI 2005 CIEE
Programs offering course: Open Campus Block
Open Campus Track: STEM and Society
Language of instruction: English
U.S. semester credits: 3.00
Contact hours: 45.00
Term: Fall Block II 2020

Course Description

This interdisciplinary course treats the rapid and large-scale change that characterizes what some scholars now refer to as the 'Anthropocene'. Students will learn about how potent, anthropogenic drivers and fast-paced technological changes impact developing countries. Topics include globalization, climate change, population transitions and trends, urbanization, water and energy issues, dietary transitions, and disruptive technologies, complex adaptive systems and scenario planning.

Learning Objectives

By completing this course, students will:

- Investigate and define the global changes our planet is undergoing due to human activities
- Describe the trends of human population growth, distribution, and social-economic conditions of these populations are evolving with its implications for the environment.
- Use scientific data that documents climate change, its causes and consequences to humans and the environment and use it to explain what can be done to mitigate and adapt to these changes.
- Articulate what disruptive and exponential technologies are and how they will affect humans and their environment.
- Develop skills relating to managing complex systems and using scenario planning for adapting to global change.

Course Prerequisites

None.

Methods of Instruction

Students will attend lectures and related field and workshop activities. Lectures will be complemented by experiential learning and critical thinking. Students will read and analyze current literature as well as monitor technological trends in the internet. Students will spend time in the field collecting field data to complement theoretical aspects of the course. During the course students will be engaged in student-led seminars to discuss trends and technologies related to global change.

Assessment and Final Grade

1. Weekly Quizzes (five) 25%
2. Global Change and Culture Essay 10%
3. Student led seminar on Global Change 20%
4. Final Exam 25%
5. Participation and Engagement 20%
TOTAL 100%

Course Requirements

Weekly Quizzes (five)
Each week, students will take a quiz on the previous week’s course material, including lectures, labs, activities and readings. Quizzes may be in-class activities with True/False, Multiple Choice, calculations, filling in blanks and short answer questions, or they may be take home essay assignments. Quizzes will cover only new material, but similar questions to those on the quizzes will be seen again on the comprehensive final exam.

**Global Change and Culture Essay**

Students will write a 500-word essay addressing both how global environmental change impacts culture and how culture impacts rates of habitat loss, biodiversity protection, hunting pressure, exploitation of natural resources and other drivers of global change.

**Student led seminar on Global Change**

At the beginning of the course, each student will be assigned a relevant issue in Global Change. They will be tasked with finding appropriate reading material, distributing it to their classmates with previous approval of the instructor and conducting a one our discussion seminar for the rest of the class. Students will be graded as follows

**Seminar Assessment (total of 20% for final evaluation)**

- Relevance of literature presented 5%
- Ability to engage the class in the topic 5%
- Relevance and depth of discussion 5%
- Participation in classmate’s seminars 5%

**Final Exam**

At the end of the course, students will take a final exam covering all previous material. As with quizzes, the final exam will have a variety of question formats, including True/False, Multiple Choice, calculations, filling in blanks, essay and short answer questions.

**Participation**

Participation is defined as meaningful contribution in the digital classroom, using the resources and materials presented to students as part of the course. Meaningful contribution requires students to prepare in advance of each recorded session and regularly engage with the resources, discussions, reflective assignments, and all other online learning activities. Students are required to demonstrate engagement with course materials, for example, through insightful, constructive comments and by using subject-appropriate terminology in: online discussion boards, peer-to-peer feedback (after viewing the presentations of others), interaction with guest speakers, where available, and submissions related to other outside-of-class activities. Students should ensure that submitted commentary balances opinions, general impressions, and specific and thoughtful criticisms or contributions. Grades are based on the content, depth, and quality of the aforementioned types of meaningful contributions as measured per the Participation grading rubric in Canvas.

Students are also expected to use the Canvas inbox for communicating any clarifying questions they may want to ask about assessments or other course requirements.

**Technology Requirements**

Participation requires access to a computer with microphone (a headset and microphone are preferred over built-in sound devices) and webcam; a stable and strong internet connection; and a quiet and well-lit environment.

**Attendance**

**Expectations:** In an asynchronous online learning format, attendance takes the form of active student engagement:

- in instructional activities, course content, course tools
- with the course instructor, other students, and
- by timely completion of all assessments.

“Attendance” is more than just logging into the course on Canvas. Students must establish a record of participation in academically related activities in order to comply with this requirement.

Academically related activities include, but are not limited to:
• submitting an academic assignment;
• taking an exam or quiz;
• attending a study group that is assigned by the instructor;
• participating in an online discussion about academic matters, designed by the instructor; or
• initiating contact in Canvas with the instructor to ask a question about the academic subject studied in the course.

Academically related activities do NOT include activities where a student may be present, but not academically engaged, such as:

• logging into an online class without active participation
• contributing to or engaging in the CIEE Orientation or Community Course(s)

First Week of Class: Online courses officially commence on the first day of the term. Students must demonstrate engagement in class by no later than day 5 of the term, or risk being administratively dropped from the course with no opportunity to re-enroll. Students administratively dropped from the course for failure to engage will be considered withdrawn from the program and subject to CIEE financial withdrawal policies and fees.

Duration of Course: Continued, regular class engagement is required throughout the scheduled duration of the course, and disengagement will result in a lower participation grade for any affected CIEE course. Due to the intensive schedules for completing courses online, consistent failure to engage in the course on a weekly basis (defined as failing to engage for two or more weeks of online learning) will result in a formal written warning from the CIEE Center Director.

CIEE instructors/staff will monitor student engagement on a weekly basis.

The weekly schedule below outlines due dates for asynchronous learning activities for this course.

N.B. Please note the class schedule is subject to change if opportunities arise to enhance the curriculum.

Weekly Schedule

Week 1
Class: 1.1 The Anthropocene

What is the Anthropocene? Is it a valid term? What are the characteristics of this great acceleration of change and what are its underlying causes? Students and instructor will discuss the ethical implications of accepting the Anthropocene. What are the critics and supporters of the Anthropocene have to say. What are the ethical implications of accepting this proposed geological age?

Readings:
• Weyler, R. 2016. The Anthropocene Debate. Blogpost

Week 2
Class: 2.1 Human Population and Consumption

Quiz 1

Human Population Changes in the Anthropocene. Students will learn how human populations tend to behave in terms of their growth rate. They will understand the concept of demographic transitions and how they affect the projections of human populations in the future. Students will also learn about what factors are shaping the behavior and distribution of populations and the great challenges we will face in the future as the trend towards urbanization occurs. Students will investigate the different challenges in population trends for tropical and temperate regions.
Students will learn to interpret population pyramids and to compare trends from tropical and temperate countries. They will learn this by using online tools and data that are currently available from sources such as the UN. At the end of the session the difference of the challenges faced by tropical and temperate nations will be discussed.


Class: 2.2 Human Population and Consumption

Climate Change and its Causes: one of the most relevant changes happening in the world is the
variation of climate patterns. Students will learn the difference between climate and weather. They will be exposed to the basics of the carbon cycle and the effect of GHG on climate. Students will be exposed to the source of the data that has been used to document climate change. Students will use local climatic variables (temperature, rainfall, number of storms) from online weather station data and compare their point measurements to long term trends. The activity underscores the difference between weather and climate. From these data students will draw their own conclusions of climate change in their region.

Readings:


**Week 3**

**Class: 3.1 Climate Change**

**Quiz 2**

Effects of Climate Change. Students will study the predicted effects climate change is expected to have, the mechanisms behind these changes and the implications for human populations and the environment. The topics will include changing weather patterns and their implications for human and non-human life, sea level rise, human migration and conflict, changing distributions of tropical diseases. Students will engage in talks with local experts about concrete changes in ecosystems in the region and their implications on culture and society.

Readings:


**Class: 3.2 Climate Change**

Mitigation and Adaptation. Students will be introduced to concrete solutions available through the applied science that can help mitigate the causes of climate change and help human populations adapt to inevitable changes. This class will focus on the areas of agriculture, transportation and electric generation. Students will investigate sites nearby where both mitigation and adaptation measures are being applied. They will learn local initiatives on electric mobility and carbon neutrality implemented in the region.

Readings


Due: Global Environmental Change and Culture essay

**Class: 3.3 Climate Change**

IPCC and Global Initiatives to Mitigate Climate Change. Students will learn the institutional structures provided by the United Nations and the financial and political strategies provided by them for tackling climate change through diplomacy. They will learn through case studies how these international policies manifest themselves at regional or country-level actions. They will also explore the role of culture in readiness to accept and implement these recommendations and follow internationally-dictated guidelines.

Readings:

Class: 4.1 Disruptive Technologies

Quiz 3

Students will be introduced to the concepts of disruptive and exponential technologies and what their effects on the world, particularly Developing countries, may be. Students will read and discuss the case study of the sharing economy (Air B&B, Uber and others) and its impact on housing and transportation worldwide. They will then investigate their own examples of disruptive technologies and share them with one another. Students will interview key informants regarding their perspectives on how disruptive technologies change the local economy and lead to environmental and social change.

Readings:


Class: 4.2 Disruptive Technologies

The Energy Sector. During this session students will be exposed to the controversy regarding renewable, decentralized production versus the established centralized energy distribution model. What are the changes that need to happen in order for renewables to become the dominant form of energy production? The concepts of smart grids, decentralization and home production will be discussed. Students will discuss environmental paradoxes in renewable energy under the existing model of production.

Class: 4.3 Disruptive Technologies

Food Production. Students will be exposed to the predominant paradigm of industrialized agriculture. Its effect on food security of developing nations and its weaknesses regarding its sustainability, and its effect on global climate and biodiversity. Students will be posed with the question of what disruptive technologies exist in the world today that could change the way the food industry works. Students will discuss their findings regarding possible disruptive technologies for the food industry and what their effects could be on local economies, global food trade and the environment. Topics of dematerialization, democratization and decentralization will be addressed.

Week 5

Class: 5.1 Adapting to New Technology

Quiz 4

Transportation. Students will learn of what the current paradigm in transportation is and what technologies are threatening to change this paradigm. Students will be assigned three topics for discussion. Legislation that favors electric vehicles, urbanization vs. rural ecological footprints, and the use of telecommuting and virtual technologies for work and education. Students will discuss these topics and their economic, social and environmental implications for developing countries.

Readings:


Class: 5.2 Adapting to New Technology

Job Displacement by Technology. During this topic students will learn the trends in labor-disrupting technologies. Mechanization, artificial intelligence and mass learning platforms will be included in this lecture. They will discuss the social, cultural and economic implications of the human workforce and its replacement by robots.

Readings:
Class: 5.3 Adapting to new technology

Adapting to Exponential Technologies. What skills do students need to focus on to adapt to disruptive technologies taking into account the rate at which they are changing. The lecture will address skills like Managing big data, developing social skills, understanding exponential technological change, critical thinking, systems thinking, entrepreneurship and cultural agility.

Week 6

Class: 6.1 Planning for Global Change

Quiz 5

Complex Adaptive Systems. Students will be introduced to the concepts of complex adaptive systems and how to think holistically about large-scale systems. Concepts of system resilience, thresholds, panarchies and adaptive systems and key variables will be introduced. Students will conduct a group exercise using different case studies to conceptualize a complex adaptive system. During the study they will develop skills of identifying system boundaries, identifying upper and lower panarchies, identifying the stage of system with regards to the adaptive cycle, identify key variables.

Readings:
- Complex Adaptive Systems https://www.youtube.com/watch?v=jBgq9eS6t_I&list=PLsJWgOB5mIMCiKZu61rKFT_-TncWzyIN8&index=3

Class: 6.2 Planning for Global Change

Resilience Thinking. Students will study the concept of resilience, what are the characteristics of resilient systems, how can they be maintained and how this knowledge can be used to preserve desirable systems or disrupt undesirable systems. Students will conduct a case study based on real data of a social-ecological system in the local region. Particularly they will learn to select key variables that could play a role in tipping the system into alternate states.

Readings:

Class: 6.3 Planning for Global Change

Future Scenario Planning. Students will be introduced to scenario planning for the future as a tool to adapt to global change. Skills to be addressed will be key variable identification, identification of possible thresholds, selecting mitigation and adaptation actions, enhancing system resilience. Students will work in groups to create alternate scenarios for a real-life case study. They will be required to apply the knowledge they have acquired during the course.

Readings:

Final Exam

Course Materials

Readings
• Singularity University. An Exponential Primer 2017. Singularity University. https://su.org/concepts/
• Walker, B. & Salt, D. 2006. Resilience thinking: Sustaining ecosystems and people in a changing world. (Chapters 1, Ch 2, and Ch 6 (Pages 145-148). Complex Adaptive Systems https://www.youtube.com/watch?v=jBq9eS6t_I&list=PLsJWgOB5mIMCIKZu61rKFT_-TncWyIN8&index=3