Course title: Global Change and the Environment
Course code: (GI) ENVI 2005 BAAR
Programs offering course: Buenos Aires 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 I 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 25%
2. Global Change and Culture Essay 10%
3. Student led seminar on global change 20%
4. Final Exam 25%
5. Participation 20%
TOTAL 100%

Course Requirements
Weekly Quizzes
Each week, students will take a quiz on the previous week's course material, including lectures, labs, activities
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-hour 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

Each student is required to attend all sessions of the course and to participate actively in class discussions, class activities, field sessions, field research, with invited speakers and during site visits. Be prepared to take notes while doing the readings as well as during lectures and related activities.

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:
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 do the critics and supporters of the Anthropocene have to say. What are the ethical implications of accepting this proposed geological age?

Readings:


**Week 2**

Class: 2.1 **Human Population Changes in the Anthropocene**

**Quiz 1**

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.

Readings:


Class: 2.2 **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 Effects of Climate Change

Quiz 2

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 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 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:


Week 4

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 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 for 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 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 Transportation

Quiz 4

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: 5.3 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 Exponential Technologies

What skills do students need to focus on to adapt to disruptive technologies taking into account
Week 6

Class: 6.1 Complex Adaptive Systems

Quiz 5

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=jBgg9eS6t_I&list=PLsJWgOB5mIMCikZu61rKFT_-TncWzyIn8&index=3

Class: 6.2 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 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


