



昆山杜克大学
DUKE KUNSHAN
UNIVERSITY

ENVIRON 200 LEVEL

Human Domination of the Earth

Spring 2016

Dates / contact hours:	300 minutes of contact time per week for 7 weeks
Academic Credit:	1 course
Areas of Knowledge:	NS (Natural Sciences) (recommended)
Modes of Inquiry:	STS (Science, Technology, & Society) (recommended)
Course format:	Student-led discussion/seminar, oral presentations, team-based debates

Instructor's Information

James F. Reynolds
Professor of Environmental Sciences and Biology
Duke University
(919-732-9803; james.f.reynolds@duke.edu)

Prerequisite(s), if applicable

None

Course Description

Human domination of the Earth encompasses a wide range of topics, including climate change, land use change (deforestation, loss of biodiversity, agriculture, etc.), population growth, pollution of land/water/air, etc. Humans developed agriculture, cities, and contemporary civilizations during the Holocene (the geologic epoch of the past 12,000 years) when the world's population was very small, widely-dispersed, and technologically-limited. Overnight (at least in geologic terms) the human population has exploded to 7+ billion and human-induced changes are evident everywhere: over 40-50% of the planet's land surface has been transformed by agriculture, urbanization, and commercialization; billions of tons of coal and oil are burned every day, emitting pollutants and greenhouse gases to the atmosphere; most major cities of the world are shrouded by toxic pollution; recent estimates suggest as many as one half of all species on Earth will be extinct in less than 100 years due to habitat destruction, pollution, invasive species, and climate change; and it is estimated that by 2025, over two-thirds of the world's population may face water shortages. It is evident the Earth has entered a new geologic epoch – the Anthropocene – one that is uniquely characterized by the major impact of human activities on both the biophysical and biological spheres of the Earth. The question is: can our planet continue to provide an accommodating environment for humanity?

Course Goals / Objectives

This course has two general goals: (1) To present a big picture of the Anthropocene. Student will examine both the *proximate* and *ultimate* drivers of global change (e.g., agriculture, urbanization, overpopulation); identify their impacts (e.g., deforestation, carbon emissions, loss of biodiversity, depletion of ground water, melting of permafrost); and explore their consequences (climate change, threats to food security, rising sea levels, potential economic and social disruption, etc.). (2) The second goal is to emphasize that the human species has an extraordinary will for survival and that there are many cultural, educational, institutional, technical, legal, and regulatory practices that could lead to effective adaptation and/or reversal of the many detrimental changes in the planet. However, there is no unique “recipe book” of solutions. Today’s students, born into the Anthropocene, have inherited an unprecedented challenge: they must be prepared to contribute to solutions to solve the greatest test facing human society: Human Domination of the Earth.

Required Text(s)/Resources

Storms of My Grandchildren by James Hanson
Bloomsbury USA, 336 pages (2010)
ISBN-10: 1608195023

The Collapse of Western Civilization: A View from the Future
Columbia University Press, 104 pages (2014)
ISBN-10: 023116954X

Required readings will be posted on Sakai. This will be a mixture of (1) primary scientific literature, e.g., from *Science*, *PNAS*, and *Nature*; (2) current newspapers (*Guardian*, *Economist*, *New York Times*, *Wall Street Journal*, *China Daily*, etc); (3) web-based resources (World Bank, UNCCD, United Nations Framework Convention on Climate Change, Pew Institute, Future Earth, etc); and (4) a wealth of miscellaneous videos.

Recommended Text(s)/Resources

None

Additional Materials (optional)

For each class, additional reading/video material is provided. Students are not required to view this or to discuss in the classroom. However, many find these resources to provide a wealth of supplemental information that they can use to supplement key messages/facts. It’s not uncommon that these materials address specific questions raised in the classroom.

Course Requirements / Key Evidences

No formal lectures are given (other than 'mini' lectures in response to student questions or when it is deemed important to communicate key concepts).

Grading is based on student participation in the following categories:

1. CURRENT EVENTS BLOG. Each week a different student posts a current event related to class discussions, which is discussed at beginning of class
2. STORMS BLOG. Two students are designated Chapter Forum Leader (FL) for each chapter of Storms of My Grandchildren. The FLs are required to post two questions concerning facts, data, ideas, etc., that they find especially interesting or new and/or relevant to previous topics covered in class or in the readings. It's open-ended but must contribute to the class goals. The remaining students post replies to one of each FL's questions. The instructor participates to provide feedback (regarding factual information and/or interpretations).
- 3a. CLASS PARTICIPATION (discussant). Students are provided a rubric (see below) explaining their responsibilities
- 3b. CLASS PARTICIPATION (DL). For each class reading assignment, two individual students are assigned as Discussion Leaders (DL), independently dividing the responsibility for certain topics.
- 3c. CLASS PARTICIPATION (Group Debates). One or two group assignments (depending on time constraints) will be made in which students must independent work together to present views, debate a topic, etc.
4. ORAL PRESENTATIONS. Each student is required to make 3-4 oral presentations (5-10 mins)

<u>CATEGORIES</u>	<u>% of total grade</u>
CURRENT EVENTS BLOG	5%
STORMS BLOG	10%
CLASS PARTICIPATION (DISCUSSANT)	30%
CLASS PARTICIPATION (DL)	20%
CLASS PARTICIPATION (TEAM)	15%
<u>ORAL PRESENTATIONS</u>	<u>20%</u>
TOTAL =	100%

(Points will be adjusted if assignments are adjusted.)

Technology Considerations, if applicable

Sakai is used to deliver all course material. Laptops in classroom are encouraged but managed in context of course discussions. Anonymous, on-line peer feedback is provided to each student speaker following a rubric.

Assessment Information / Grading Procedures

1. CLASS DISCUSSION (DISCUSSANT) (0-10/class). After the first week, a grade is given for each class meeting (10, 8, 6, or 5: see rubric below). This grade is based on the maximum of (1) each student's self-evaluation and (2) the instructor grade. The only rule: if there is a discrepancy of 3 points a meeting is required, for example, Student=8, Instructor=5 or Student=10, Instructor=6.

CLASS PARTICIPATION RUBRIC (10 pts/class)
10 pts = Student proactively contributes to class discussion in a HIGHLY SIGNIFICANT MANNER. This includes (some but not necessarily all of the following): offers scholarly ideas and insights, asks good questions, shows command of key issues in articles, integrates previous topics into the discussion (i.e., synthesis), is highly engaged and so forth
8 pts = Student proactively contributes to class discussion in a SIGNIFICANT MANNER
6 pts = Student contributes to class discussion
5 pts = Student in attendance but does not contribute to class discussion

2. CLASS DISCUSSION (DISCUSSION LEADER). Handouts are provided that explain various ways to lead discussions. Students are free (in fact, encouraged) to be creative.

DISCUSSION LEADER RUBRIC (10 pts)
5 pts = Well-prepared, thoughtful and insightful scholarly leadership (e.g., enticing critical thinking by peers, encouraging synthesis of ideas, and so forth)
3 pts = Attempt to integrate previously-covered topics/principles in discussion
1 pts = "What did you think of the paper"?
<u>1 pts</u> = Kept discussion on tract
10 pts TOTAL

2. CLASS DISCUSSION (TEAM). Detailed handouts are provided to explain objectives of exercise and responsibilities of each Team. Each Team appoints a Captain but all are given same grade.

3. ORAL PRESENTATIONS. Student are provided with multiple examples and guidelines as to how to prepare an oral presentation, e.g., <https://www.youtube.com/watch?v=vruOPYLlwEU> and are given a copy of the rubric that will be used to grade their presentation. Each oral presentation has a theme but all topics must be approved by instructor. Students receive anonymous feedback from their peers via Poll Everywhere (real time but summarized by instructor afterwards, along with my feedback).

THEME FOR ORAL PRESENTATION 1: Topic of interest that is (or may) impact a student's hometown, village, state, or country

THEME FOR ORAL PRESENTATION 2: To be determined

THEME FOR ORAL PRESENTATION 3: Class Film Festival on Quantum Retro-causality. Details provided at <https://www.youtube.com/watch?v=e0tzT2Zw1xY>

Typical Classroom Session

Students will arrive in class having read papers and/or watched video presentations. During the first week of the class I assume the role of Discussion Leader to demonstrate what DLs are supposed to do. When serving as DL I explicitly tell the students what I'm attempting to do when I make different kinds of statements (e.g., devil's advocate, expressing a strong opinion, taking a complete opposite position of some author or video, making a statement like "I did not like this paper because ..." and so forth). Time is allotted to STORMS BLOG discussion in class (but the length varies depending upon the topic).

Diversity and Intercultural Learning

Readings and cases will be drawn from thinkers and situations spanning the globe. Team assignments will involve the deliberate creation of intercultural and interdisciplinary teams by the instructors. Attention in readings and class time will be devoted to the challenges and principles of team-building in these contexts. Grades for the students' team assignments and classroom participation will reflect their effort and ability to work successfully in an intercultural setting. Guidance on group work and class participation will be provided for students not accustomed to open discussion style of pedagogy.

Course Policies and Guidelines

Course Instructors' expectations for all assignments and activities will be made as explicitly as possible, given the likelihood of a wide range of background conventions and habits among the students. The Duke Kunshan University Community Standard will be discussed and adhered to.

ACADEMIC INTEGRITY:

Each student is bound by the academic honesty standard of the Duke Kunshan University. Its Community Standard states: "Duke Kunshan University is a community composed of individuals of diverse cultures and backgrounds. We are dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Members of this community commit to reflect upon and uphold these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity."

CLASS ATTENDANCE:

Students are responsible for all the information presented in class. As indicated above, class attendance and participation are important components of the grade. All students are expected to participate during class time.

POLICY ON MAKE-UP WORK/EXAMS:

Students are allowed to make up work only if missed as a result of illness or other unanticipated circumstances warranting a medical excuse, consistent with DKU policy. You must notify the instructor in advance if you will miss an exam or project deadline. Documentation from a health care provider is required upon your return to class. Project extensions requested for medical reasons must be negotiated at the time of illness.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES:

If you require academic accommodation, you must first register with the Dean of Students' Office. The Dean of Students' Office will provide you with documentation that you must then provide to

me as the faculty member for this course at the time you request the accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework.

Tentative Course Outline or Schedule

WEEK	TOPICS
1	WELCOME TO THE ANTHROPOCENE. Themes of Olympic opening ceremonies: Beijing versus London; The Great Acceleration; What you have inherited; LAWS OF PHYSICS: Facts, assumptions, assertions, projections; Scientific consensus; A list of key facts; BASIC CHEMISTRY OF THE ANTHROPOCENE; Greenhouse gases; Pollutants; Heavy metals
2	PLANETARY BOUNDARIES: A SAFE OPERATING SPACE FOR HUMANITY; Living in the doughnut: A safe and just space for humanity? Thresholds and boundaries; Intro to tipping points; GLOBALIZATION AND THE ENVIRONMENT: I=PAT (Impact = Population x Affluence x Technology); Consumption and over-consumption; Asians: The new meat-eaters
3	INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC): 5 th Climate Assessment Report, the latest scientific consensus; A look at the 2015-2016 calendar of events; UN MILLENNIUM DEVELOPMENT GOALS: Goals or Fantasies? The 2015-2016 calendar of events; MERCHANTS OF DOUBT: 40% of all adults on Earth have never heard of climate change; Contrarians, doubters, skeptics and “balanced coverage” by the news media; Public opinion: Country comparisons; REVIEW: ARE YOU PREPARED? Let’s play Jeopardy; ORAL PRESENTATIONS #1
4	MAN’S ADDICTION TO FOSSIL FUELS: Fracking: The new global phenomenon; Oil consumption: China versus USA; China: the “new” USA? Peak Oil; FOOD SECURITY: China has 22% of the world’s population but only 7% of its arable land; China’s food security is a matter of global concern; THE GREAT GLOBAL LAND GRABS: Western colonialism via guns versus Chinese colonialism via money; Case study in Laos; TROPICAL DEFORESTATION: Why it matters; Palm oil: Global ‘gold’, environmental disaster; FROM LAND GRABS TO RESOURCE WARS? What’s in the future? ORAL PRESENTATIONS #2: GLOBAL CRISIS OVER THE AMAZON COMMONS
5	RUNNING DRY? The American Dust Bowl revisited. A Bolivian Dust Bowl in the making? How long before the Great Plains runs out of water? The Chinese South-to-North Water Diversion Project: a mistake of global proportions? WATER SECURITY: Peak water; Water privatization: another type of land grab? Water wars and the evidence; Resource conflicts in general; Water cooperation: myths and reality. WATER: THE FIRST MAJOR GLOBAL CRISIS? A look a on-going droughts in the world; Lake Mead is drying up; California towns are adapting? Is Lanzhou New City a wise idea? Flow of the Yellow River; Chinese dams and cross-border conflicts; USA and the Colorado River: Mexico’s loss.
6	TECHNOLOGY TO THE RESCUE!! Risks, risks, risks, risks risks, risks; Do you believe in magic? GEOENGINEERING: AWESOMENESS OR MADNESS? The 2015 National Academic Report of potentials and limitations; THE STERN REPORT: Why the world ignored it; “Discounting rates” from Economy 101 illustrates Rich versus Poor nations – Guess who is going to disproportionately suffer from climate change? Deforestation? Sea level rise? Is it really economics versus the environment? Counterintuitive behavior: Not what it seems? Can you really love your unborn grandchildren?

7	<p>FILM FESTIVAL: STUDENT ENTRIES. Theme: In 2030, an advanced technology known as Quantum Retrocausality became a reality. QR enables students to transmit messages back in time. Therefore, although its 2016 students will be able to hear what their life is like on Planet Earth in 20 years! Film Festival</p> <p>Trailer: https://www.youtube.com/watch?v=Q3MvIPpua0s</p> <p>Quantum Retrocausality [QR] http://goo.gl/8MSHw</p> <p>Assignment example: https://www.youtube.com/watch?v=e0tzT2Zw1xY</p> <p>CONTEXT: It's the year 2037. In 2025 a technology known as Quantum Retrocausality [QR] became a reality. Students prepare an 8 to 10 min [max] video on their lives in the year 2037. All videos will be shown during the Film Festival (open to the DKU community). The only inviolate rule is that you must adhere to one of our key themes: "... nature and the laws of physics cannot be compromised - they are what they are" (pg. xi of STORMS). For example, in 2037, China will NOT be covered by an ice sheet and the state of Arizona will be NOT be inundated by seawater. Obviously many events (both POSITIVE and NEGATIVE) will either have occurred or have some probability of occurring over the next 20 years (you may want to use the 2013 IPCC 5th Climate Assessment Report as a guide). You're free to discuss any topic relevant to Human Domination of the Earth, be it geological (e.g., sea level rise), ecological (e.g., loss of Great Barrier coral reef in Australia), technological (e.g., new advances in geoengineering), biological (loss of Amazon forests or a reversal?), atmospheric (increase/decrease in storms), cultural (urbanization), and so forth.</p>
---	---

16 October 2015 version to be posted