

February 6, 2017 version – subject to modification

DETAILED Syllabus – subject to modification
Earth's Climate: Past, Present and Future; Concerns and Solutions
Facilitator: Paul Belanger - OLLI south campus – 8 weeks
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Spring Term - OLLI South

Thursdays 9:30-11:30 March 30th – May 18th, 2017

Facilitator: Paul Belanger; pebelanger@glassdesignresources.com; cell 303-249-7966
If you are unable to attend the first session, please notify the facilitator by email or phone.
Classroom Assistant: TBD

Course description: go to <http://denverclimatestudygroup.com/> and click on OLLI tab to find class description, slides, links and weekly updates.

Class Type: Illustrated Lectures/Discussion; in lieu of 3rd class there will be a field trip to National Ice Core Lab located at USGS in Lakewood; <http://icecores.org/> set for 10:15 a.m. Thursday May 4th.

Materials Fee: None

Strongly recommended reading: read or be familiar with concepts presented in the following book:
What We Know About Climate Change by Kerry Emanuel, 2nd Edition 2012, 120 pages — An outline of the basic science of global warming and how current consensus has emerged.

Websites that I ask you to review and become familiar:

<http://www.skepticalscience.com/>

<http://www.realclimate.org/>

Difference between Climate change and global warming:

<https://www.skepticalscience.com/climate-change-global-warming.htm> with this video:

<https://youtu.be/HAF9jl6fupA>

Full list of videos you may wish to review at your leisure:

<http://www.skepticalscience.com/denial101x-videos-and-references.html>

1. Week of March 27th:

Introduction/Key principles of climate change

- The difference between weather and climate
- Climate system: feedbacks, cycles and self-regulation (climate, not government)
- What determines Earth's climate
- Might start Earth's past and finish next week

2. April 6th:

Earth's past

- Earth's deep past before the Cambrian (600 MaBP): hot and cold

- Earth's past: Cambrian onward: mostly hot-house Earth; 100s parts per million (ppm)
- Climate trend in the Cenozoic – the last 65 million years; proxy data from 3600ppm to <200 ppm.
- More recent past: 180-280 part per million; how do we know – empirical data. Preview of next week's field trip
- Today: 400 ppm and growing ~3ppm/year

3. April 13th

Earths present and future - ocean acidification

- **THIS WAS SUPPOSED TO BE A FOLLOW UP TO THE ICE CORE LAB FIELD TRIP (but could not schedule except for Thursday May 4th):**
- Antarctic ice cores
- Arctic Ice cores
- What the data tells us
- Signs of climate change/how has it changed: ocean acidification, Arctic warming
- Global carbon emissions of Carbon dioxide (CO₂) and Methane (CH₄)

4. April 20th: possible advance speaker for Anthropocene

Ocean acidification, rates of change & modeling

- Future projections and feedbacks:
- Models
- Rates of change: analogs and various comparisons to the past
- IPCC Fifth Assessment report (AR5): <http://www.ipcc.ch/report/ar5/>
- The Pope's encyclical: google it or go here http://denverclimatestudygroup.com/wp-content/uploads/2014/10/2015.05.24-papa-francesco_20150524_enciclica-laudato-si.pdf

5. Week of April 27th:

Denial and Solutions Part A:

- **Denial 101x:**
- here's a link to a newly available self-paced version of the course I took in April and May: <https://www.edx.org/course/making-sense-climate-science-denial-ux-denial101x-0>
- Climate Intervention Proposals aka Geoengineering:
 - Solar Radiation Management (SRM)
 - and Carbon Dioxide Removal (CDR)
- Economics:
 - economics of doing nothing vs. the economics of mitigation: Lomborg, Stern, Nordhaus
- **Game changers for taking Carbon out of the atmosphere:** existing technologies/promise, but at what cost? (One might be surprised).
- Biochar vs. BECCS solutions

6. MAY 4TH FIELD TRIP

Ice core field trip at USGS for about 20 persons Tuesday May 4th 10:15 a.m. **(important: bring government issued ID)**, hat, coat, gloves for – 40 degrees F. and adequate time to be checked in at the gate – details to follow in class.

- it will include some lecturing by Ice Core Lab personnel:
 - Antarctic ice cores
 - Arctic Ice cores
 - What the data tells us

7. May 11th : - may occur earlier on April 20th - TBD

Guest speaker, Bob Raynolds: The Anthropocene

- Welcome to the Anthropocene and looking ahead

8. May 18th :

Solutions, part B; conclusion

- It's not about climate change as much as sustainability
- **Game changers: Energy solutions**
- Urban heat islands
- Food security
- Population growth; potential refugee issue of climate change
- Your carbon footprint; what can YOU DO
- Wrap-up



Some links I'd like you to investigate:

- <http://www.nybooks.com/articles/archives/2015/jun/04/new-solution-climate-club/> and
- <http://carbon-price.com/wp-content/uploads/2015-01-04-Nordhaus-ClimateClubAEA-v2-slides.pdf> (30 slides, Jan, 2015)
- <http://citizensclimatelobby.org/>

and others that I'll be updating on class web page

Books/Materials:

1) **see above for strongly recommended read before class---easy read**

2) **Other Optional** reading – see suggestions at bottom of the OLLI page I have for y'all at

http://denverclimatestudygroup.com/?page_id=24

Don't Even Think About It: Why Our Brains are Wired to Ignore Climate Change by George Marshall 2014, 272 pages. Both available from Amazon, Barnes & Noble, Tattered Cover in book, e-book, or audible forms.

3) Slides, links, and additional resources posted on the OLLI class link at

<http://www.denverclimatestudygroup.com/>.

4) Handouts