Hailey Rosenthal
Natural Science Petition
MES Application

I am writing to request a waiver for the prerequisite in Natural Science for the MES program at Evergreen State College. I recently completed the course: Climate Policy and Action: Science and Policy Basics during the fall quarter at Evergreen. This course was instructed by Dr. Anthony Levenda. I have included the syllabus for the course as well as Dr. Levenda's reading guides for weeks 2 and 3 of the quarter. Please note that there was no reading guide for our first class (week 1). These reading guides briefly summarize key concepts from each week's assigned readings. As shown in the syllabus and the reading guides, we spent the first third of the quarter understanding the earth's natural climate system, including:

1) Basic system dynamics, atmosphere, hydrosphere, biosphere, geosphere, and anthroposphere
2) Earth's energy budget, solar energy, reflection, and the greenhouse effect
3) The carbon cycle- exploring the natural carbon cycle, perturbations in carbon stocks and flows, and the climate's response to these perturbations.

Dr. Levenda posted framing lectures to prepare us for class discussion. Week 2 detailed the earth's energy balance and climate controls and week 3 reviewed the greenhouse effect and carbon cycle. The assigned readings included a textbook by Sarah Burch and Sara Harris titled "Understanding Climate Change". We were assigned the following chapters relevant to natural sciences:

Chapter 2: Basic System Dynamics
Chapter 3: Climate Controls: Energy from the Sun
Chapter 4: Climate Controls: Earth's Reflectivity
Chapter 5: Climate Controls: The Greenhouse Effect
Chapter 9: Impacts of Climate Change on Natural Systems

Here is the quiz along with my answers that were assigned during week 3.

In the Earth's climate system, what are the important stocks and flows that we are interested in for global heating? Explain how these stocks and flows influence heating. Then explain the concept of feedbacks and lags in your own words. Provide one or two examples of feedback loops (hint chapter 4) that influence climate change. Feel free to use outside sources to provide examples.

In the Earth's climate system, we are interested in understanding the concentration of carbon dioxide in earth's atmosphere (stock). More specifically, we want to look at the rate of inflows and outflows. Inflows include carbon dioxide emissions from burning fossil fuels for transportation and energy, and deforestation. Outflows include carbon sequestration in the biosphere through natural processes such as carbon uptake from plants and vegetation, as well as new technologies that are developed that mirror this form of carbon sequestration. The outflows of atmospheric concentrations of carbon dioxide do not make up for the rate of inflows causing the stock of atmospheric concentrations of carbon dioxide to increase. This in turn contributes to an increase in global temperatures primarily through a process known as the greenhouse

effect. Earth absorbs 48% of solar energy and emits it back into the atmosphere through 3 processes: convection (5%), evaporation (25%), or the emission of thermal infrared energy (17%). The latter process, emission of thermal infrared energy, does not transfer all 17% of the energy back into space. Greenhouse gas molecules, including carbon dioxide, absorb 5-6% of thermal infrared energy radiated by the surface. When this occurs, temperatures rise, and re-radiates thermal infrared energy in all directions, including into Earth's surface. This causes warming. However, there is a "lag" between the action of increased carbon dioxide in the atmosphere and its full effect on earth. The ocean's absorption of energy helps slow the full effect. Lastly, there are feedbacks that can amplify or stabilize the current state of the earth. An example of an amplifying feedback starts with warmer temperatures due to increased levels of carbon dioxide in the atmosphere. This increases the rate of ice melt and decreases the reflectivity of solar energy directly into space (lower albedo). Since there is less ice then the earth absorbs more energy and thus emits thermal infrared energy which is trapped in the atmosphere. An example of a stabilizing feedback is how earth will emit more energy when it heats.

The reflectivity of Earth's systems is important for global energy balance. Please explain the concept of albedo. Then describe how different surfaces of the Earth contribute to changes in the climate. Provide at least two examples of how humans might change the albedo of the Earth. What impacts do these changes have on our climate? Please feel free to use outside sources for examples and evidence.

Albedo is a measure of how reflective a surface or an object is. It can affect temperature and climate patterns due to the amount of energy reflected or absorbed. For example thick ice sheets such as glaciers have high albedo and reflect a lot of solar energy or sunlight. This can cool temperatures. Dark forests or oceans have low albedo and absorb solar energy, which leads to warming. Albedo is important because it influences earth's energy balance. Human activities have caused the loss of high albedo surfaces through ice melts and land use changes. This loss in turn causes the earth to asborb more energy, which leads to greater warming. The loss of glaciers on earth reduce the amount of solar radiation reflected back into space. Lastly, land use changes, such as deforestation can negatively alter a surface's albedo. For example, concrete and asphalt absorb solar energy and vegetation in forests can reflect it.

Climate Policy and Action: Science and Policy Basics

Fall 2023 | Wednesdays 6:00-9:30pm SEM2E2109 + online asynchronous

Anthony M Levenda, PhD | anthony.levenda@evergreen.edu |
https://www.evergreen.edu/climate

Office hours will be Wed 3-5 in SEM2E2106 or on Zoom by appointment, just email and we can set up a call.

Overview

This class explores key concepts in climate science and policy. The world's best scientists have said that to have a good chance of keeping the safest level of heating (1.5 degrees Celsius), we must cut global carbon emissions by nearly half by 2030, and must make "far-reaching and unprecedented changes in all aspects of society" (IPCC 2018). The fundamental goal of the course is to equip you intellectually to better understand basic concepts in climate science and policy so we can tackle this challenge. We will start with an overview of climate science and review key concepts of the Earth's energy balance, system feedbacks, climate models and scenarios, and impacts on human-natural systems. With this basis, we will have a better understanding of the climate crisis. The premise of all critical education is that greater understanding can yield more effective action.

One of the most important courses of action is policy. And at this point, all policy is climate change policy. The challenges and solutions for climate change span across society and the economy, which means that addressing the climate crisis requires transformative change to both eliminate greenhouse gas emissions and adapt to the impacts of climate change. Global greenhouse gas emissions need to reduce rapidly in the next ten years and reach net zero around mid-century in order to have a chance of avoiding dangerous climate change. At the same time, climate change is exacerbating existing societal vulnerabilities and is having deep impacts across natural and social systems. Therefore, we will explore how policy can enable the transformation necessary to address this crisis. We will explore theories behind and practical approaches to the multilevel governance of climate change. We will also cover a range of public policy areas related to climate change mitigation and

adaptation, including energy supply, energy use and demand, carbon markets and economic tools, food and agriculture, and transportation. The goal is to help each of us learn more about dealing with complexity in climate policy-making and the range of actors involved in climate change policy spanning multiple levels of government as well as non-state actors.

Learning objectives include:

- Basic knowledge and understanding of climate science and societal causes of climate change as well as key policy instruments in climate policy
- Analyze the impacts of climate change on people and places, especially on vulnerable populations
- Understand the evolution of US climate policy, including the role of ideas and actors in the policy process across multiple levels of government
- Identify and evaluate responses and solutions to climate change including mitigation of greenhouse gas emissions, adaptation to warming, public perceptions, and policies from the local to the global
- Effectively communicate in writing the issues and debates around the human dimensions of climate change and climate justice

This is the first of three courses apart of the **Climate Policy and Action Certificate**. The Winter quarter class builds on the fundamentals we discuss in this course to leverage more in-depth climate policy analysis and advocacy, with a focus on climate justice, equity, and positive visions. We also more broadly cover "climate action" looking at different social actors who influence policymaking through protest, movement-building, and other forms of influence. The Spring quarter is focused on an internship or research project experience in which we will apply the knowledge and new skills gained to work on real-world climate action. More information about the certificate program can be found at the website: https://www.evergreen.edu/certificates/climate-policy-and-action

Student work

Student evaluations will be based on quality completion of all elements of the program: attendance and participation, and completion of a series of assignments of various scales. Students are expected to attend and participate in all class sessions. Please note: attending means not only being present, but offering full attention to the work at hand. All students must be prepared and ready to contribute to seminar, starting by bringing the reading to

every seminar. You must bring your book to seminar, or a printout of any PDF that is available. This is important because you build on your initial reading through discussion and will need to refer to passages in the text. Expect to hear faculty and students read aloud passages (and if you feel comfortable, be prepared to read aloud as well). Reading out loud underscores significant ideas of the text and increases student comprehension. Students will work with the text in small and large groups.

Full credit can be earned by doing all of the following:

- Reading assigned texts in advance of class
- Participating in class activities (participation is defined as active listening, speaking, thinking)
- Attending class (attendance is a precondition of participation)
- Completing all assignments by the date due.
- Writing a narrative self-evaluation for your transcript
- Your evaluation will consist of your seminar leader's written evaluation of your work, your required self-evaluation, and the evaluation meeting. You will be evaluated on your level of comprehension of the material, on your skills (writing, thinking, speaking, listening, research, presentation), and engagement.

Assignments and requirements

1. **Attendance & Participation.** A key part of your evaluation for this program will be participation. We expect everyone to "show up" ON-TIME to lecture class and seminar and participate in all program activities. If a student must be absent due to a valid reason, contact me in advance of the absence so I know what is going on as I will be taking attendance. 2-3 unexcused absences will result in loss of credit.
2. **CANVAS is our home base!** Nearly all the work we do will be launched or accessed on CANVAS. You should be regularly checking in to the CANVAS site to stay updated on work. Each week you will go to the next module in the CANVAS modules page and follow the instructions for the week.
3. **Framing Lectures: Asynchronous learning.** Starting in week 2, I will prepare and post a lecture prior to our meetings on Wednesday. You will need to a) WATCH it ahead of time and b) POST a comment on the discussion board set up for that framing lecture ahead of time. Please write out 1) two important points or concepts you learned from the framing lecture and 2) two questions or comments you have about the lecture.

4. **Seminar Preparation and Participation.** You are required to arrive to class (a) having read the entire assigned reading, (b) with your copy of the assigned reading in actual or electronic form, and (c) you should bring to seminar some notes with the following that you are ready to discuss:
    a. 1 key new learning for you from the text about climate science and policy.
    b. 1 or more key concepts or historical events you learned from the text.
    c. 2 issues from the text and a page # that you'd like to discuss in seminar that comes from the reading.
5. **Presentations and activities.** We will have many active learning activities where students will present material or present their own work that is included in awarding credit.
6. **Written Assignments.** All your written work will follow the written assignments template: Typeface, margins, numbering pages, and collating pages for assignments:
    a. All typed assignments should use a 12 point font such as Times or Times New Roman and be SINGLE SPACED
    b. Your documents margins should be set at 1" top/bottom/left/margins. Each page must be numbered at the bottom. Use either your "footer" or the insert page number command.
    c. Write Name and Date at the top left side of your paper. Title below.

    Written Assignments include:

        i. **Short Learning Review Assignments**. You will turn in several short guided-reviews of learning modules:
            1. What do scenarios tell us about our future? (DUE: Week 3 Wednesday @5pm)
            2. How should we govern climate change? (DUE: Week 4, Monday @1pm)
            3. Building a national climate policy: IRA vs GND (DUE: Week 6, Monday @1pm)
            4. Imagining adaptive futures (DUE: Week 9, Monday @1pm)
        ii. **Synthesis Paper.** You will complete one concise 4-5 page academic paper that will more deeply explore topics we cover in the program and offer a thesis about climate policy and action. DUE: Tuesday, Week 8 by 11:59pm.
        iii. **Collaborative project.** Each student will be a part of a team that researches a policy for the state of Washington by scanning the landscape of climate policies around the planet. Each team will choose

a challenge, apply concepts, and start to make recommendations for climate policy locally.

Weekly outlook

ASYCHRONOUS (on your own time)	Reading, Writing, Preparation, and film viewing on own, including Canvas lectures and discussions
SYNCHRONOUS (live meetings) Wednesdays 6:00-9:30pm	Seminar/Workshop in-person SEM2E2109 (Zoom option possible)

Schedule at a glance

Week	Date	Topic	Assignments
1	9/28	Introduction to the Climate Emergency	
2	10/5	Systems and Energy Balance	Online Quiz due by 5pm
3	10/12	Mitigation, Models and Scenarios	What do scenarios tell us about our future? Write-up due by 5pm
4	10/19	Climate Change Policy and Governance	How should we govern climate change? write up due by 5pm
5	10/26	Energy Supply, Demand, Markets, and Regulation	Synthesis Paper idea and outline due by 5pm

6	11/2	Federal policy	IRA versus the GND write-up due by 5pm
7	11/9	State and local policy	Collaborative Project Part 1 due by 5pm
8	11/16	Pathways for rapid decarbonization	Synthesis Paper due by 5pm
-	11/23	Break – No class meeting	
9	11/30	Climate adaptation, equity, and justice	Imagining Adaptive Futures write-up due by 5pm
10	12/7	Group Presentations	Collaborative Project Part 2 due by 5pm
	12/12-16	Evaluation Week Conferences	

Detailed Schedule

Week 1: Introduction to the Climate Emergency (in-person)

1. Read
   1.1. Naomi Klein. 2019. "Introduction: We are the wildfire." *On Fire: The Burning Case for a Green New Deal.* New York: Simon and Schuster.
   1.2. Burch, Sarah and Sara Harris. (2021). *Understanding Climate Change*. University of Toronto Press. **Chapter 1**
   1.3. Stokes, Leah. (2020) "A Field Guide for Transformation." (listen) or (read)
2. Review
   2.1. https://www.nytimes.com/interactive/2021/12/13/opinion/climate-change-effects-countries.html
   2.2. https://www.desmog.com/climate-disinformation-database/

2.3. https://www.unep.org/explore-topics/climate-action/facts-about-climate-emergency

3. AV
4. Assignments
   4.1. Think through and jot down some notes about two things:
   4.2. What do I want to know about climate change science and policy?
   4.3. What are the areas, in your opinion, that we can make important steps for climate action?

Week 2: Earth Systems and Energy Balance

1. Read

   1.1. Burch, Sarah and Sara Harris. (2021). *Understanding Climate Change*. University of Toronto Press. **Chapters 2-5**

   1.2. Selin, N.E., Stokes, L.C. and Susskind, L.E., 2017. The need to build policy literacy into climate science education. Wiley Interdisciplinary Reviews: Climate Change, 8(3), p.e455.

   1.3. Kahan, Dan M. et al. 2012. "The Polarizing Impact of Science Literacy and Numeracy on Perceived Climate Change Risks." *Nature Climate Change*. 2(10):732–35.

2. Review

   2.1. NOAA's Climate Literacy Website: https://www.climate.gov/teaching/climate

3. AV

   3.1. Watch all accompanying videos

      3.1.1. Module 2: Introduction to the Climate System

      3.1.2. Module 3: Earth's Energy Budget

3.1.3. Module 4: The Carbon Cycle

4. Assignments

4.1. Online quiz

Week 3: Mitigation, Models and Scenarios

1. Read

1.1. Burch, Sarah and Sara Harris. (2021). *Understanding Climate Change*. University of Toronto Press. **Chapters 6-8**

1.2. Rogelj, J., Geden, O., Cowie, A., & Reisinger, A. (2021). Net-zero emissions targets are vague: three ways to fix. *Nature*, 591(7850), 365–368.

1.3. [SKIM] IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels ... [web version]

2. AV

2.1. Facing it - Episode 4: Coping with Climate Despair in Four Steps

2.2. Module 5: Climate Models

2.3. Module 6: Future Climate

2.4. Module 7: Climate Change Impacts

2.5. Module 8: Climate Change Mitigation

3. Participate (if possible)

3.1. Zoom talk from 11:30am-1pm: Professor Jennifer Atkinson will deliver a talk entitled "Beyond Climate Despair: Reclaiming Hope in a Warming World."

4. Assignments

4.1. What do scenarios tell us about our future? Write-up due by 5pm

Week 4: Climate Change Policy and Governance (+Food and Agriculture Case Study)

1. Read

   1.1. Jamieson, D. (2014). "The nature of the problem." In *Reason in a dark time: why the struggle against climate change failed--and what it means for our future*. Oxford University Press.

   1.2. Burch and Harris (2021) Ch 11

   1.3. Ostrom, Elinor. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environmental Change 20 (4): 550–557.

   1.4. Bulkeley, Harriet et al. 2012. "Governing Climate Change Transnationally: Assessing the Evidence from a Database of Sixty Initiatives." *Environment and Planning C: Government and Policy* 30(4): 591–612.

   1.5. Bernstein, S., & Hoffmann, M. (2019). Climate politics, metaphors and the fractal carbon trap. *Nature Climate Change*. https://doi.org/10.1038/s41558-019-0618-2

2. Participate (required)

   2.1. Food Justice and Climate Change Symposium on Zoom 7-9pm

   2.2. Check out: Farmworkers and the Climate Crisis (2022)

3. Review

   3.1. Sabel, Charles and David Victor. How to Fix the Climate, Boston Review

4. Assignments

   4.1. Varieties of Governance write up due by 5pm

Week 5: Energy Supply, Demand, Markets, and Regulation (in-person)

1. Read

   1.1. Saundry, Peter D. 2019. "Review of the United States energy system in transition." Energy, Sustainability and Society. (9)4, 1-32.

   1.2. Green, F & Dennis, R. (2018). Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies. Climatic Change, 150(1-2), 73–87. https://doi.org/10.1007/s10584-018-2162-x

   1.3. Green, J. F. (2021). Does carbon pricing reduce emissions? A review of ex-post analyses. Environmental Research Letters: ERL [Web Site], 16(4), 043004.

   1.4. Stokes & Mildenberger (2020). https://bostonreview.net/articles/leah-c-stokes-matto-mildenberger-tk/

   1.5. Williams, E.L., Bartone, S.A., Swanson, E.K. and Stokes, L.C., 2022. The American electric utility industry's role in promoting climate denial, doubt, and delay. *Environmental Research Letters*, *17*(9), p.094026.

2. Review

   2.1. International Energy Agency (2021). *World Energy Outlook (Executive Summary).* Available at: https://www.iea.org/reports/world-energy-outlook-2021/executive-summary

   2.2. Supran, Geoffrey and Naomi Oreskes. "Assessing ExxonMobil's climate change communications (1977–2014)." 2017. *Environmental Research Letters.*

3. AV

   3.1. Living in Denial – Prof Kari Norgaard

   3.2. Merchants of Doubt – Evergreen Library

4. Assignments

    4.1. Synthesis Paper idea and outline due by 5pm

Week 6: Federal Policy

1. Read

    1.1. Erick Lachapelle & Matthew Paterson (2013) Drivers of national climate policy, Climate Policy, 13:5, 547-571, DOI: 10.1080/14693062.2013.811333

    1.2. Bigger, Patrick, Johanna Bozuwa, Mijin Cha, Daniel Aldana Cohen, Billy Fleming, Yonah Freemark, Batul Hassan, Thea Riofrancos. 2022. *Inflation Reduction Act: The Good, The Bad, The Ugly.* Climate and Community Project.

    1.3. Bapna, Manish, Sarah Dougherty, Brendan Guy, Carolina Herrera, Amanda Levin, Simon Mui, Derek Murrow, Jake Schmidt, Douglass Sims, Sasha Stashwick, Luke Tonachel & Andrew Wetzler. 2022. *Inflation Reduction Act: A Big Step Toward a Climate-Safe Future*. NRDC.

    1.4. CPCC. 2022. *Analysis of Climate and Energy Provisions in the Inflation Reduction Act of 2022*.

    1.5. Leber, Rebecca. 2022. The US finally has a law to tackle climate change. Vox.com

    1.6. Stokes, L.C., Ricketts, S., Quinn, O., Subramanian, N., Hendricks, B. and Collaborative, E., 2021. A Roadmap to 100% Clean Electricity by 2035. *Evergreen Collaborative*.

2. Review

    2.1. Inflation Reduction Act (2022)

    2.2. Prakash, Aseem, and Nives Dolsak. "Americans Say They're Worried about Climate Change – so Why Don't They Vote That Way?" *The Conversation*.

3. AV

3.1. Senate Climate Change Task Force discuss Civilian Climate Corps

4. Assignments

4.1. IRA versus the GND write-up due by 5pm

Week 7: State and Local Policy

1. Read

1.1. Stokes, Leah Cardamore. 2020. *Short Circuiting Policy: Interest Groups and the Battle Over Clean Energy and Climate Policy in the American States*. New York, NY: Oxford University Press.

1.2. Basseches, J.A., Bromley-Trujillo, R., Boykoff, M.T. *et al.* Climate policy conflict in the U.S. states: a critical review and way forward. *Climatic Change* **170**, 32 (2022). https://doi.org/10.1007/s10584-022-03319-w

1.3. Fuhr, H., Hickmann, T., & Kern, K. (2018). The role of cities in multi-level climate governance: local climate policies and the 1.5 C target. Current opinion in environmental sustainability, 30, 1-6.

1.4. Stokes, L. C., & Breetz, H. L. (2020). States of crisis: subnational inaction on climate change in the United States. In Handbook of US environmental policy. Edward Elgar Publishing.

1.5. Jennifer L. Rice (2014) Public Targets, Private Choices: Urban Climate Governance in the Pacific Northwest, The Professional Geographer, 66:2, 333-344, DOI: 10.1080/00330124.2013.787011

1.6. Rice, J. L., Cohen, D. A., Long, J., & Jurjevich, J. R. (2020). Contradictions of the climate-friendly city: new perspectives on eco-gentrification and housing justice. *International journal of urban and regional research*, *44*(1), 145-165.

2. Review

2.1. HEAL ACT

2.2. CCA

2.3. https://climateactiontracker.org/countries/usa/

3. AV

3.1. WEC Climate Commitment Act Discussion

3.2. EJ Making Policy Real: The HEAL Act and EJ Council

4. Assignments

4.1. Collaborative Project Part 1 due by 5pm

Week 8: Rapid decarbonization across all sectors

1. Read

1.1. O'Brien, K. (2018). Is the 1.5°C Target Possible? Exploring the Three Spheres of Transformation. Current Opinion in Environmental Sustainability, 31, 153–160.

1.2. Bauer, & Fontenit, G. (2021). Plastic dinosaurs – Digging deep into the accelerating carbon lockin of plastics. Energy Policy, 156, 112418–. https://doi.org/10.1016/j.enpol.2021.112418

1.3. Lenzi, D. (2018). The ethics of negative emissions. Global Sustainability, 1. https://doi.org/10.1017/sus.2018.

1.4. Nilsson, L. J., Bauer, F., Åhman, M., Andersson, F. N. G., Bataille, C., de la Rue du Can, S., Ericsson, K., Hansen, T., Johansson, B., Lechtenböhmer, S., van Sluisveld, M., & Vogl, V. (2021). An industrial policy framework for transforming energy and emissions intensive industries towards zero emissions. Climate Policy, 21(8), 1053–1065.

1.5. Meckling, J., Kelsey, N., Biber, E., & Zysman, J. (2015). Winning coalitions for climate policy. Science, 349(6253), 1170-1171.

2. Review

    2.1. Galvin, R., & Healy, N. (2020). The Green New Deal in the United States: What it is and how to pay for it. Energy Research & Social Science, 67, 101529.

    2.2. NREL Decarbonizing Transport

3. AV

    3.1. Article – How to Reach US Net Zero by 2050- Rissman

    3.2. Podcast – Rebecca Doll on Decarbonizing heavy industry

4. Assignments

    4.1. Synthesis Paper due by 5pm

Week 9: Climate adaptation, equity, and justice

1. Read

    1.1. Burch and Harris (2021) Ch 10+12

    1.2. Hughes, S., & Hoffmann, M. (2020). Just urban transitions: Toward a research agenda. Wiley Interdisciplinary Reviews. Climate Change, 11(3), e640

    1.3. Whyte, K., 2017. Indigenous climate change studies: Indigenizing futures, decolonizing the Anthropocene. *English Language Notes*, *55*(1), pp.153-162.

    1.4. Whyte, K., 2020. Too late for indigenous climate justice: Ecological and relational tipping points. *Wiley Interdisciplinary Reviews: Climate Change*, *11*(1), p.e603.

    1.5. Colgan, Jeff D., Jessica F. Green, and Thomas N. Hale. 2020. "Asset Revaluation and the Existential Politics of Climate Change." *International Organization* (2021).

    1.6. Koslov, L. (2016). The case for retreat. *Public culture*, *28*(2), 359-387.

2. Review

    2.1. EPA website on PNW Adaptation

    2.2. National Climate Assessment PNW

    2.3. The Challenge of Equity in California's Climate Action Plans

3. AV

4. Assignments

    4.1. Imagining Adaptive Futures write-up due by 5pm

Week 10: Presentations of Final Projects (in-person)

Presentations in class

Final class meeting in-person

Group Project part 2 due by class meeting time

Additional resources

1. NY Times Climate - https://www.nytimes.com/section/climate

2. Washington Post/Monkey Cage Topic Guide: Climate Change – https://docs.google.com/document/u/1/d/e/2PACX-1vSGX3e4RD5UhofZfaMEKTcce-NFqWaOwXrmoiY9DdSNYiIAUQ07ppgZAwYlIrWf0Z74P-PeQUdj6ecI/pub

3. Dawn King videos: https://www.choices.edu/scholar/dawn-king

4. Brulle, Robert J. & Kari Marie Norgaard. 2019. "Avoiding cultural trauma: climate change and social inertia." *Environmental Politics*. (28)5, 886-908.

5. Elliott, Rebecca. 2019. "The Sociology of Climate Change as a Sociology of Loss." *European Journal of Sociology*. (59)3, 301-337.

6. Oreskes, Naomi and Erik M. Conway. 2010. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming.* New York: Bloomsbury Press. Selections.

7. http://forecast.uchicago.edu/lectures.html

8. Harvey, Hal, Robbie Orvis, and Jeffrey Rissman. 2018. *Designing Climate Solutions: A Policy Guide for Low-Carbon Energy*. Washington: Island Press.

Professionalism

Professionalism is important for staff, faculty, and students. In the (Zoom) classroom, it implies the following: (a) being accountable and taking responsibility for your actions; (b) keeping appointments; (c) being honest; (d) being engaged with the topic and the class; (e) communicating clearly and concisely in class and over email; (f) arriving on time and ready to work; (h) keeping the professor aware of any situations that might affect your performance; and (i) fostering a relationship of mutual respect—no sexist, racist, homophobic, or otherwise disrespectful comments will be tolerated.

COVID Policies

Health and Well-Being are central to student success, and at Evergreen we are committed to creating and maintaining a learning and working environment that is healthy, accessible, and equitable.

Evergreen has adopted a vaccination requirement to ensure maximum opportunities are available on campus as conditions allow.

Mask Requirement. Evergreen does not have a college-wide mask requirement. Though not required, mask-wearing is optional and encouraged. Students, staff, and faculty will have

different levels of comfort in wearing masks, and we should all endeavor to foster an ethic of care, consideration and acceptance in our learning community.

Any program/class member who feels ill with headache, excessive fatigue, fever, coughing, congestion, or other symptoms should stay home, notify the faculty, and submit a Health Verification Form (in my.evergreen.edu). Faculty will provide you with guidance on continuing your academic work and the College's COVID team will provide direction on managing your health risks.

If you have questions or concerns, please contact your faculty. If you wish to report a covid safety issue contact covid@evergreen.edu.

Canvas

Please have a personal account on http://canvas.evergreen.edu, including a close-up photo of your face (so we can all recognize each other). You can also access our Canvas page via http://my.evergreen.edu All communication will be sent only to your evergreen.edu address, so if you use another address you must forward your Evergreen emails to it. Students must check their email accounts regularly, at least once every weekday! Please use only your Evergreen address to communicate with faculty.

Week 2 Reading Guide

This week we will be covering a lot of material on the basics of climate science. The Canvas quiz under the Week 2 Module will help you focus on a few key terms, but there are many concepts that build on each other, such as stocks and flows, feedback, and systems.

Burch and Harris (2021). *Understanding Climate Change*.

Chapter 2: Important to read the whole chapter because this provides a lot of the background information on the Earth's climate system, including how to define a system and changes in a system, as well as the different parts of Earth's climate system and the basics of the Earth's energy budget. Some important ideas that I think you should keep in mind:

- Systems fluctuate over time based on inflows/outflows, stocks, feedback and lag. The stock of CO2 in the Earth's atmosphere, for example, needs to decrease, so outflow must be greater than inflow.
- Earth's climate system is made up of interconnected parts: atmosphere, hydrosphere, biosphere, geosphere, and anthrosphere. While we are concerned with atmospheric stocks (or concentrations) of CO2, it is important to understand how and where carbon flow in different parts of the Earth's climate system.
- Earth's energy budget (Figure 2.7) is central to understanding global heating. It is influenced by three "climate controls": solar energy, the reflectivity of Earth, and the greenhouse effect.

Chapter 3: This chapter is focused on understanding solar energy and radiation. Many students who have taken college physics courses may find this chapter accessible, but many who have not had those courses might find this chapter quite difficult. I encourage you to focus on the main points listed on Page 39. Try to find material in the chapter that helps you make sense of those main points. But there are many parts of this chapter that you can skip or skim. You can likely skip/skim these sections:

- Skim or skip 3.1.1 except last paragraph - just know the Sun and Earth give off energy as radiation but the Earth gives off longer wavelength radiation (that is important later because it means it can get trapped in the atmosphere)
- Skim or skip 3.2.2 (all subsections) - just remember that natural variability occurs due to changes in the Earth's orbit around the Sun
- Skim or skip 3.2.3 unless you are interested

Chapter 4: Please try to read most of the chapter because it has important examples of feedback loops caused by Earth's reflectivity (albedo). Understanding the basics of albedo can help us evaluate the effectiveness of climate geoengineering projects and weather or not they should be considered in our efforts.

- Skim or skip section 4.1.2.1 (aerosols) and 4.1.2.2 (clouds) because it is a bit in the weeds.
- Skim 4.2.2 (anthropogenic aerosols) - just know pollutants from human activities can contribute to reflectivity in the atmosphere but often they are bad for human/ecosystem health

Chapter 5: Important to really dig into this chapter on the greenhouse effect to understand the main discussions in climate change mitigation. I encourage you to focus primarily on this chapter if you only read one chapter this week.

- Don't worry too much about understanding all of 5.1.1 because we can discuss in class, but remember that these principles of chemistry and physics are why CO2, CH4(methane), and nitrous oxide (N2O) are of key concern.
- Focus on 5.2 and 5.3. These are absolutely central to understand for the debates about climate change, human impacts, and solutions for mitigation including why we care about the 1.5 and 2 degrees C limits in global climate change treaties and activism.

Selin, Stokes, Susskind (2017). "The need to build policy literacy into climate science education."

Please at least skim the additional readings on climate literacy and policy literacy. These will help us in seminar to discuss the importance of understanding climate change on policy and vice-versa. Please be prepared to discuss!

Kahan et al (2012). " The polarizing impact of science literacy and numeracy on perceived climate change risks."

Please at least skim the additional readings on climate literacy and policy literacy. These will help us in seminar to discuss the importance of understanding climate change on policy and vice-versa. Please be prepared to discuss!

Additional resources can be found here:

- Yale Program on Climate Change Communication: https://climatecommunication.yale.edu/
    - TAKE THIS QUIZ! https://climatecommunication.yale.edu/about/projects/global-warmings-six-americas/

IMPORTANT!

**Don't forget to do the quiz on canvas:
https://canvas.evergreen.edu/courses/6009/modules/items/471601

**Notes to bring to class:

a. 1 key new learning for you from the text about climate science and policy.
b. 1 or more key concepts or historical events you learned from the text.
c. 2 issues from the text and a page # that you'd like to discuss in seminar that comes from the reading.

Week 3 Reading Guide

This week we will be covering a lot of material on climate mitigation, scenarios, and models. I want you to focus on mitigation and scenarios, but try to absorb a bit of the material on models so you get a sense of how climate scientists make predictions. The Short Learning Review Assignment for the Week 3 Module will help you focus on a few key ideas around climate scenarios. Different scenarios are constructed to represent our efforts to mitigate climate change. Which ones seem most realistic or have the highest probability of occurrence?

Burch and Harris (2021). *Understanding Climate Change*.

Chapter 6: Important to read the whole chapter because this provides a lot of the background information on climate mitigation and will help lay the groundwork for next week's material on energy systems.

- What is demand-side and supply-side mitigation? What are some examples?
- How important is carbon capture and storage for realizing our climate goals?
- What are some other strategies to decarbonize our economy?

Chapter 7: Please skim this chapter and focus on things that stand out to you. I want you to have a basic understanding of climate models, but not necessarily know everything about the different types of models described in 7.2. Climate models are representations of Earth's climate system. They are usually mathematical models with equations that relate stocks and flows. The more complex climate models are dynamic, with feedbacks, lags, and evolution of the system over time (Burch and Harris 2021, p. 124).

- What is the greatest source of uncertainty in climate models?

Chapter 8: Please read the entire chapter. Scenarios are essential to understanding the impacts that different climate policies and emissions pathways have on the Earth's climate.

- What is a projection? Prediction? Scenario?
- What are the different kinds of scenarios that exist in major climate models? Differences between SRES and RCPs?
- What is the likelihood that we pass 1.5C warming this century?

Please also read the WaPost article and the Essay by Chiara Di Leone for more journalistic and reflective writings on the topic of climate scenarios.

**Notes to bring to class:

a. 1 key new learning for you from the text about climate science and policy.
b. 1 or more key concepts or historical events you learned from the text.
c. 2 issues from the text and a page # that you'd like to discuss in seminar that comes from the reading.