

Ecology, Environment, & the Anthropocene Course-at-a-Glance:

Week	Major Topic(s)	Key Questions	Readings	Events & Assignments	In-class activities and objectives:	Comp Lab?
01	Introduction to Ecology & Ecosystem Services	<ol style="list-style-type: none"> 1. What is ecology? 2. How is the field of ecology organized? 3. How does ecology relate to other biological sciences? 4. How are ecology and environmental science related? 5. What benefits and services do we derive from healthy, functioning ecosystems? 	<ul style="list-style-type: none"> ▶ <i>Millennium Ecosystem Assessment</i> "Living Beyond Our Means: Natural Assets and Human Well-Being" ▶ <i>Scientific American</i> "The economist has no clothes" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets (extra credit this week only) ➤ <i>Syllabus</i> distributed ➤ <i>LMS Warm-up Assignments</i> discussed ➤ There are extra-credit Follow-Up Questions for this week 	<p>Group Activity: Assessing the Value of Ecosystem Services</p> <ul style="list-style-type: none"> • Compose a list of resources that are provided by ecosystems to humanity; • Assess which resources are not ecosystem services, explaining the rationale for excluding these resources; • Explain how ecosystems produce each of the listed resources; and • Explain how depletion of this ecosystem service would be costly. 	NO
02	Change in Nature	<ol style="list-style-type: none"> 1. What is ecological succession? 2. How are ecological and evolutionary change different? 3. How are ecological and evolutionary change intertwined? 4. How have ecosystems of the past changed in response to large-scale change? 5. How do scientists know determine whether species will be able to adapt to anthropogenic change? 	<ul style="list-style-type: none"> ▶ <i>Kimball's Online Biology Text</i> "Forest Succession" ▶ <i>Scientific American</i> "Tiny Plants that Once Ruled the Seas" ▶ <i>Scientific American</i> "The Last Great Global Warming" ▶ <i>Science</i> "Entering the Sixth Mass Extinction" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ Class visits a computer lab: remember to bring your Pratt ID!! ➤ <i>Term Project Guidelines</i> distributed & discussed ➤ There are extra-credit Follow-Up Questions for this week ➤ LMS Warm-up Assignments due, TBD @ 23:55 EST 	<p>Group Activity: Finding Evidence for Adaptation to Anthropogenic Change</p> <ul style="list-style-type: none"> • Use the internet to find sources of scientific data that report on the ability of different species to adapt to anthropogenic change; • Decide which sources provide valid scientific data, which provide valuable information but not true scientific data, and which sources are unreliable; and • Characterize how much is known about the ability of species to adapt to anthropogenic change. 	YES

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03	Interaction in Ecological Communities	<ol style="list-style-type: none"> 1. What forms can population growth take? 2. What factors regulate population growth? 3. What are the different ways in which organisms can interact? 4. What comprises an ecological community? 5. How does ecological efficiency limit the size of food webs? 6. What makes an ecological community stable? 	<ul style="list-style-type: none"> ▶ <i>Jensen</i> "Eco 101: Exponential Growth and Decay" ▶ <i>Jensen</i> "Eco 101: Carrying Capacity" ▶ <i>Science</i> "Lessons from the Wild Lab" ▶ <i>Nature</i> "Legend of the Wolf" ▶ <i>Scientific American</i> "Ecosystems on the Brink" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ There are extra-credit Follow-Up Questions for this week 	<p>Group Activity: Impacts on the Yellowstone Community</p> <ul style="list-style-type: none"> • Use a food web diagram to predict how introduction of wolves to the Yellowstone community would impact prey species; • Use a food web diagram to predict how introduction of wolves to the Yellowstone community would impact competitor species; • Predict how the population of wolves and elk will change over time; and • Assess different class predictions based on their ecological logic and feasibility. 	NO
04	Ecological Cycling	<ol style="list-style-type: none"> 1. How does energy move through an ecosystem? 2. How does matter move through an ecosystem? 3. How does water move through an ecosystem? 4. What roles do organisms play in the cycling of water, energy, and matter? 	<ul style="list-style-type: none"> ▶ <i>Scientific American</i> "Global Population and the Nitrogen Cycle" ▶ <i>Nature</i> "The Power of Plankton" ▶ <i>Nature</i> "A Long Dry Summer" ▶ <i>Scientific American</i> "The Hidden Life of Truffles" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ Class visits a computer lab: remember to bring your Pratt ID!! ➤ There are extra-credit Follow-Up Questions for this week 	<p>Group Activity: The inter-relationships between ecological cycles</p> <ul style="list-style-type: none"> • Consider how cycles of matter (carbon, nitrogen, and water) and flows of energy are inter-related in ecosystems; • Do appropriate web research to better understand how these cycles/flows are inter-related. • Construct a concept map designed to teach others that explicitly shows how these cycles/flows are inter-related; and • Present your concept map to the rest of the class so that we can: <ul style="list-style-type: none"> • discuss how these ecological flows are inter-related; and • compare and contrast different ways of representing information on a concept map. 	YES

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05	Biomes & Ecological Resilience	<ol style="list-style-type: none"> 1. What are the major characteristics of different earth biomes? 2. How does ecological succession produce biomes? 3. What factors determine the form and function of different biomes? 4. What are the major threats to these biomes? 5. What determines whether species are resilient to human impacts on biomes? 	<ul style="list-style-type: none"> ▶ <i>Kimball's Online Biology Text</i> "Biomes" ▶ <i>NASA Earth Observatory</i> "Biomes" ▶ <i>National Geographic</i> "Our Good Earth" ▶ <i>National Geographic</i> "Ghost Cats" ▶ <i>NPR Weekend Edition Saturday</i> "On The Trail Of A Mountain Lion..." 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ There are extra-credit Follow-Up Questions for this week ➤ Term Project Initial Source List due TBD @ 11:55 pm 	<p>Group Activity: Collective Biome Visions</p> <ul style="list-style-type: none"> • Create a poster that depicts the climate, landscape features, vegetation and animal life of a particular biome; • Illustrate the ecological interactions that occur within this biome; • Depict the anthropogenic threats to this biome; and • Explain how the geographical location of this biome explains both the ecosystems it supports and the relative level of threat that humans pose to this biome. 	NO
06	Biodiversity Conservation	<ol style="list-style-type: none"> 1. Why is biodiversity important? 2. How is the growth of human populations impacting the earth's biodiversity? 3. How do we conserve biodiversity? 4. What are invasive species and how do they threaten biodiversity? 	<ul style="list-style-type: none"> ▶ <i>Scientific American</i> "Which Species Will Live?" ▶ <i>Scientific American</i> "Conservation for the People" ▶ <i>Encyclopedia of Life</i> "What is an Invasive Species?" ▶ <i>Scientific American</i> "A Friend to Aliens" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ Class visits a computer lab: remember to bring your Pratt ID!! ➤ There are extra-credit Follow-Up Questions for this week 	<p>Group Activity: How biodiversity impacts ecosystem services</p> <ul style="list-style-type: none"> • Explore the connection between the biodiversity of different ecosystems, various ecosystem services, and measures of human well-being. • Explore how regional biodiversity produces ecosystem services and how ecosystem service provision is regionally distributed. • Report your findings to the rest of the class. • Review and respond to the findings of the rest of the class. 	YES
07	Climate Change	<ol style="list-style-type: none"> 1. What evidence suggests that climate change is affecting ecosystems? 2. How might climate change affect the earth's ecosystems in the future? 3. What are the major anthropogenic causes of climate change? 	<ul style="list-style-type: none"> ▶ <i>National Climate Assessment</i> "Ecosystems, Biodiversity, and Ecosystem Services" ▶ <i>Scientific American</i> "Arctic Plants Feel the Heat" ▶ <i>Scientific American</i> "Storm of the Century" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ There are extra-credit Follow-Up Questions for this week 	<p>Group Activity: Identifying priorities for mitigating climate change</p> <ul style="list-style-type: none"> • List and categorize different ways that we might reduce the contribution of human activities to climate change; • Identify what information is needed in order to prioritize different potential strategies for mitigating climate change; and • Diagram your group's strategy for deciding what changes in human activities have the greatest potential for mitigating climate change. 	NO

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08	Term Project Proposal Workshop			<ul style="list-style-type: none"> ➤ Draft Term Project Proposal due on the <i>LMS</i> before class meets and in printed form when you arrive in class 	<p>Group Activity: Term Project Proposal Workshop</p> <ul style="list-style-type: none"> • xxxx 	NO
09	Pollution: Nutrients & Toxics	<ol style="list-style-type: none"> 1. What is the impact of human activity on the nutrient levels experienced by ecosystems? 2. How have human activities altered the flow of materials within and between ecosystems? 3. How does pollution alter the functioning of ecosystems? 4. What risks does pollution pose to human health? 	<ul style="list-style-type: none"> ▶ <i>Scientific American</i> "Fixing the Global Nitrogen Problem" ▶ <i>National Geographic</i> "The Pollution Within" ▶ <i>Science</i> "Microplastics in the Seas" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ Class visits a computer lab: remember to bring your Pratt ID!! ➤ There are extra-credit Follow-Up Questions for this week ➤ Term Project Proposal due TBD @ 11:55 pm 	<p>Group Activity: Pollution and the built environment</p> <ul style="list-style-type: none"> • Explore the geographical relationship between various forms of pollution/pollutant effects and the built environment; • Explore how mapping tools can help us understand the actual or potential distribution of pollutants and their effects; • Find evidence for environmental injustice related to the geographical distribution of pollutants and their effects; and • Report your findings to the rest of the class. 	YES
10	Urban Ecology	<ol style="list-style-type: none"> 1. In what ways do cities function like ecosystems? How well do urban systems mimic ecosystems? 2. How does the way a city is designed affect the way that city impacts ecosystems? 3. What kinds of ecological communities are excluded by urban development? 4. What kinds of ecological communities can be fostered by urban development? 	<ul style="list-style-type: none"> ▶ <i>The New Yorker</i> "Green Manhattan" ▶ <i>Scientific American</i> "Bigger Cities Aren't Always Greener, Data Show" ▶ <i>Motherboard</i> "The World's Most Wasteful Megacity" ▶ <i>NYC Mayor's Office</i> "One City: Built to Last" (Executive Summary only) ▶ <i>Scientific American</i> "Wading in Waste" 	<ul style="list-style-type: none"> ➤ Reading Questions due 30 minutes before your class section meets ➤ <u>Class conducted remotely</u>: please see the <i>LMS</i> for details on how to join the class online. ➤ There are extra-credit Follow-Up Questions for this week ➤ Ecological Footprint Report due, TBD @ 23:55 EST 	<p>Group Activity: Seeing the sustainability of our city</p> <ul style="list-style-type: none"> • Capture images of New York City that depict designs and/or practices that can be viewed as either "sustainable" or "unsustainable"; • Categorize, share, and explain your images via an online forum; and • On that forum, discuss the images posted by members of the class with the class at large. 	NO

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11	Sustainability 1: Boundaries for Maintaining Civilization	<ol style="list-style-type: none"> 1. What is sustainability? 2. How can ecological footprints be used to understand the sustainability of human practices? 3. How do we conceptualize sustainability from an ecological perspective? 4. What are some ways that human civilization can avoid destroying the ecological systems on which we depend? 	<ul style="list-style-type: none"> ▶ <i>Global Urbanization</i> "Human Population Grows Up" ▶ <i>National Geographic</i> "Age of Man: Enter the Anthropocene" ▶ <i>Scientific American</i> "Living on a New Earth" ▶ <i>Science</i> "Planetary boundaries: Guiding human development on a changing planet" (Summary) 	<ul style="list-style-type: none"> ➔ Reading Questions due 30 minutes before your class section meets ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ There are extra-credit Follow-Up Questions for this week ➔ Choice Readings for Week 12 should be registered on the <i>LMS</i> by TBD @ 23:55 EST ➔ Term Project Sketch due TBD @ 11:55 pm 	<p>Group Activity: Perspectives on Becoming Ecologically Sustainable</p> <ul style="list-style-type: none"> • Explore via web research a particular social/political perspective on how we should seek to become ecologically sustainable. • Staying true to the perspective that you have been assigned, compose a visual presentation designed to advocate for your group's approach to becoming ecologically sustainable. • Present your group's approach to becoming ecologically sustainable to the class and answer questions about your perspective. 	YES
12	Sustainability 2: Design, Technology, & Culture	<ol style="list-style-type: none"> 1. How is sustainability infused into the designs and practices of modern society? 2. What technologies are needed to create a more sustainable global human society? 3. How can we design in a more sustainable manner? 	<ul style="list-style-type: none"> ▶ <i>Scientific American</i> "The Efficient City" ▶ <i>Scientific American</i> "The Carbon Capture Fallacy" ▶ CHOICE readings from one of these categories: A. Agriculture; B. Biofuels; C. Ecotourism; D. Energy efficiency; E. Geoengineering; F. Green roofs; or G. Solar power (see the <i>LMS</i> to sign up for one of these categories). 	<ul style="list-style-type: none"> ➔ Reading Questions due 30 minutes before your class section meets ➔ There are extra-credit Follow-Up Questions for this week ➔ Draft Project Summary due TBD @ 11:55 pm 	<p>Group Activity: Assessing Sustainable Technologies</p> <ul style="list-style-type: none"> • Share the knowledge gained by each group member about a particular kind of sustainable design, practice, and/or technology; • Through group discussion, assess which of these "technologies" seem most promising; • Analyze your most promising "technologies", explaining how they reduce human impacts and have the potential to keep our societies within the nine "planetary boundaries"; and • Explain your group's rationale for labeling these technologies as "most promising". 	NO

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13	Sustainability 3: Quantifying the Impact of Design	<ol style="list-style-type: none"> 1. Why does sustainability have to be quantitative rather than qualitative? 2. How do we quantify the potential and actual impacts of designed products? 	<ul style="list-style-type: none"> ▶ <i>Jensen</i> "There's no such thing as qualitative sustainability" ▶ <i>Autodesk</i> "Lifecycle Assessment: An introduction for students" ▶ <i>Environment Magazine</i> "The Short List" 	<ul style="list-style-type: none"> ➔ Reading Questions due 30 minutes before your class section meets ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ Course Evaluations ➔ There are extra-credit Follow-Up Questions for this week ➔ Choice Readings for Week 14 should be registered on the <i>LMS</i> by TBD @ 23:55 EST ➔ Term Project & Term Project Summary due April 23rd, 2017 @ 11:55 pm 	<p>Individual Activity: Exploring Life Cycle Assessment</p> <ul style="list-style-type: none"> • Understand the basic manner in which a life cycle assessments (LCA's) are conducted by reviewing the results of a particular LCA with particular goals. • Explore how LCA can be used to help in making design decisions. • Recognize the role that values play in the implementation and interpretation of an LCA. 	YES
14	Sustainability 4: Science & Policy	<ol style="list-style-type: none"> 1. How can science be used to make informed policy decisions? 2. What is the boundary between science and politics? 	<ul style="list-style-type: none"> ▶ CHOICE readings from one of these categories: A. Individual; B. Institutional; C. Local; D. National; or E. International (see the <i>LMS</i> to sign up for one of these categories). 	<ul style="list-style-type: none"> ➔ Reading Questions due 30 minutes before your class section meets ➔ Bring any questions you have in preparation for the Final Exam ➔ There are extra-credit Follow-Up Questions for this week 	<p>Group Activity: Sustainable policy: At what level?</p> <ul style="list-style-type: none"> • Discuss your group's assigned level at which sustainable building is incentivized, coming up with examples of incentives at this level. • Prepare to introduce your level and the kinds incentives that motivate sustainable building at this level. • Introduce your level to the rest of the class, using examples to illustrate the kinds of incentives that motivate green building at this level. • Present an argument that your assigned level is the most effective/important level on which to incentivize sustainable building; ask skeptical questions of other groups regarding the effectiveness/importance of green building incentives at their assigned level. 	NO

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15	Final Exam taken <u>in class</u> on the <i>LMS</i> .			<ul style="list-style-type: none"> → <i>Extra credit AMNH Assignment</i> due, TBD @ 11:59 EST → Class visits a computer lab: remember to bring your Pratt ID!! 	<i>Exam</i>	YES