Environmental Chemistry, Professor Lester by Meg Schneider

A carbon calculator showing the impact of personal choices on CO₂ emissions contextualizes both personal sustainability and chemistry concepts. Fuel types (such as gasoline and gasohol) have unique energy and carbon contents, resulting in drastically dissimilar fuel costs and carbon emissions for the same trip.

Integrating Sustainability Across the Curriculum

Overview
Directly formed from the Penn Climate Action Plan initiative of “Learning Sustainability at Penn”, Penn’s Green Campus Partnership’s 8 week internship program pairs faculty members with undergraduates to integrate the concepts of sustainability into new or existing coursework.

For this summer, I worked with Professor Lester on her Environmental Chemistry class to create a Carbon Calculator; this links the abstract chemistry to real-world transportation choices and sustainability. I also worked with Professor Jerolmack for his Landscape Sustainability course. Together, these courses represent an opportunity to integrate sustainability into the curriculum, while also allowing students to see the real-world applications of sustainability concepts.

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For more information, scan the above to email me at marsch@sas.upenn.edu

Course Mission

Professor Jerolmack’s course, Landscape Sustainability, is based on the idea that the processes humans use to control their surrounding landscapes can exacerbate potential environmental problems and threaten landscape sustainability.

Intended for a non-technical audience with an interest in sustainability within or outside the Earth and Environmental Science department, the course aims to inform future decision makers on the importance of understanding underlying environmental processes before taking action.

Landscape Sustainability, Professor Jerolmack

Scope of Course

The course will focus on four main case studies that demonstrate this concept of landscape sustainability. Barrier islands, Desertification, the Mississippi river delta, and Stream erosion and restoration (see below). The barrier islands section will focus on the coasts of the Outer Banks in North Carolina as well as Long Beach, New Jersey, while the desertification topic will be explored through the Sahel and China.

Themes of Desert Case Study

1. Increasing Population, Land Use Change
2. Positive Feedback of Climate Change
3. Impact of Droughts
4. Human intervention and Prevention
5. Thresholds

Barrier Beach Case Study

Although humans often try to control barrier beaches’ natural migration with sea walls and jetties, this can increase the effect of storms.

Students will learn the dynamics of sediment balance of overwash, wind movement, and longshore drift to understand why these human solutions are inefficient and costly.


Research Methods

As I was tasked with finding course materials to be used for assigned reading, I first talked to Professor Jerolmack about the themes to be explored in each case study (see left). After this conversation, I used the scientific databases of SciVerse Scopus and Web of Knowledge, as well as local and national news sources, to find materials that demonstrated these themes.

With scientific articles, the challenge was often to find articles that were not only scientifically important (highly cited) but also understandable to a student without a scientific background. Conversely, news stories often over simplified the science and stakeholder positions. Overall, I aimed for a 50/50 balance of these materials but found more scientific journals.

After compiling a range of potential sources, Professor Jerolmack selected the materials he felt were most compelling for the course and provided further direction to research. After more material accumulation, I helped Professor Jerolmack in his outline for lecture development by providing some input on what students might think at different points.