

Kathleen Ann Lohse

Statement of Teaching Interests

My goals as an educator are to communicate information accurately and thoroughly, encourage students to think critically and creatively, motivate them to seek greater understanding in how the earth system functions, and to provide facilities and guidance necessary for students to grow as scientists and scholars. Field courses, group projects, courses using the primary literature, and summer research projects captivated my interest in ecology as an undergraduate. These kinds of experiences combine basic concepts with methods and techniques used by ecologists and teach students how to think critically and solve problems. I would like to share my enthusiasm for science in these kinds of contexts.

TEACHING INTERESTS

I am interested in teaching courses that give a foundation for understanding the fundamental processes that shape watershed responses to natural and anthropogenic changes. I am enthusiastic about teaching undergraduate courses in watershed science and management. In addition to undergraduate courses, I am excited to teach an upper division course in watershed biogeochemistry that combines field and laboratory biogeochemical and hydrological analyses with GIS and modeling.

At the University of Arizona I have developed the following classes:

- 1) **Water Quality and the Environment (UNVR 195a)** -freshman colloquium course in which students adopt their hometown watershed and follow the path that water takes from rainfall to tap and examines the hydrologic, geologic, climate, and land use/land cover controls on water quality in their watershed.
- 2) **Watershed and Ecosystem Functions (WSM/SWES/HWR 456/556)** -- undergraduate/graduate course in which students examine basic processes shaping watershed structure and function with sections in hydrology, soils, geology, ecology, and society, and examine the ecosystem services derived from watersheds. Three field trips, associated analyses and papers are integrated into the course by topics.
- 3) **Soil and Watershed Biogeochemistry (WSM 696a)** –seminar course in which students explore the different topics in soil and watershed biogeochemistry: soil formation and weathering, carbon and nitrogen cycling, watershed biogeochemistry. Students are responsible for conducting a state of the art literature review, conducting a peer-review of two papers, and communicating their findings in a presentation.

In Watershed and Ecosystem Function course, I introduce the principle of the watershed approach, focus on the basic processes shaping watershed structure and function with sections in hydrology, soils, geology, ecology, and society, and examine the ecosystem services derived from watersheds. I will employ simple hydrological modeling techniques to provide concrete examples and experience with the techniques and tools involved in watershed analyses. Group projects, oral presentations, and primary literature reading will also be important elements of this class. In particular, students will select natural and human-induced changes in watersheds (such as urban runoff, forestry, biotic invasions, and environmental pollutants) and study different ecosystem processes associated with these alterations and then synthesize this information as a group. At the end of the course, oral presentation of these papers will provide cross-comparisons of the different processes controlling fluxes

of energy and material through these watersheds. This kind of class project will teach students how to access the primary literature, to read it critically, and to develop oral and writing skills. These kinds of exercises ultimately expose students to the evolving nature of science and theories underlying watershed and ecosystem science.

In addition to the undergraduate courses, I am teaching an upper division seminar course in Soil and Watershed Biogeochemistry. This seminar course is an investigation of the physical, chemical, and biological processes that shape soils, the biogeochemistry of watersheds, and their responses to anthropogenic changes. Topics include soil formation, weathering of soils, soil carbon and nutrient cycling, and on the movement and storage of water, carbon, and nutrients in the context of a watershed. Students will be responsible for leading a topic in class and writing a review paper on a topic of their interest in soil and watershed biogeochemistry.

I also look forward to engaging undergraduate and graduate students directly in my own research where they can grow as scientists and scholars. I firmly believe in field and lab experience outside of the classroom. My own experiences as an undergraduate working with Dr. Peter Vitousek in Hawaii and writing my honors thesis under the supervision of Dr. Robert Howarth at Cornell University fueled my desire to continue my studies in ecology. Toward these goals, I will assemble a modern laboratory and cultivate a positive and stimulating research environment in which these students could learn through experience and interaction. I will involve students in all levels of my own research including research, grant writing, and manuscript preparation.