Nitrogen Cycling in the Earth’s System
(Biol 544 and SoilS 544; 3 credits, Fall 2011, MWF 8:10-9 am; Johnson 204)

Instructors: W. Pan, R. Dave Evans, and faculty in the Nitrogen Systems: Policy-oriented Integrated Research & Education (NSPIRE) graduate program

Prerequisite: Graduate standing in the Colleges of Sciences, Agriculture or Engineering.

“Nitrogen Cycling in Earth’s Systems” is a new interdisciplinary course addressing nitrogen dynamics in terrestrial, aquatic, and atmospheric systems. The course will provide a fundamental understanding of important nitrogen transformations and processes in natural and managed systems and their responses to human activities. The course will be taught by an interdisciplinary team of scientists from the Colleges of Agricultural, Human and Natural Resource Sciences, Sciences and Engineering & Architecture and will promote shared concepts and vocabulary necessary for communication across disciplines. The course goals are to 1) provide common theoretical foundations and to initiate collective exploration of relevant literature, and 2) foster interdisciplinary thinking and research development to solve complex, global nitrogen-related ecological issues. The course outline is:

I. Nitrogen geochemistry
   A. N in the solar system; geologic partitioning of N among the lithosphere, hydrosphere, and atmosphere
   B. N distribution in the biosphere
   C. Global N, C, and P cycles

II. Nitrogen in ecosystems
   A. Introduction to global nutrient cycles
   B. N cycling in terrestrial agricultural and natural ecosystems: sources, fates, transformations
   C. N cycling in aquatic ecosystems: sources, fates, transformations
   D. N in the atmosphere and oceans
   E. N limitation in natural biogeochemical systems

III. Interactions and coupling of terrestrial, aquatic and atmospheric systems

![Diagram of the Nitrogen cycle](image)

Figure 1. Schematic of the Nitrogen cycle showing multi-media exchange and the important role of human activities.